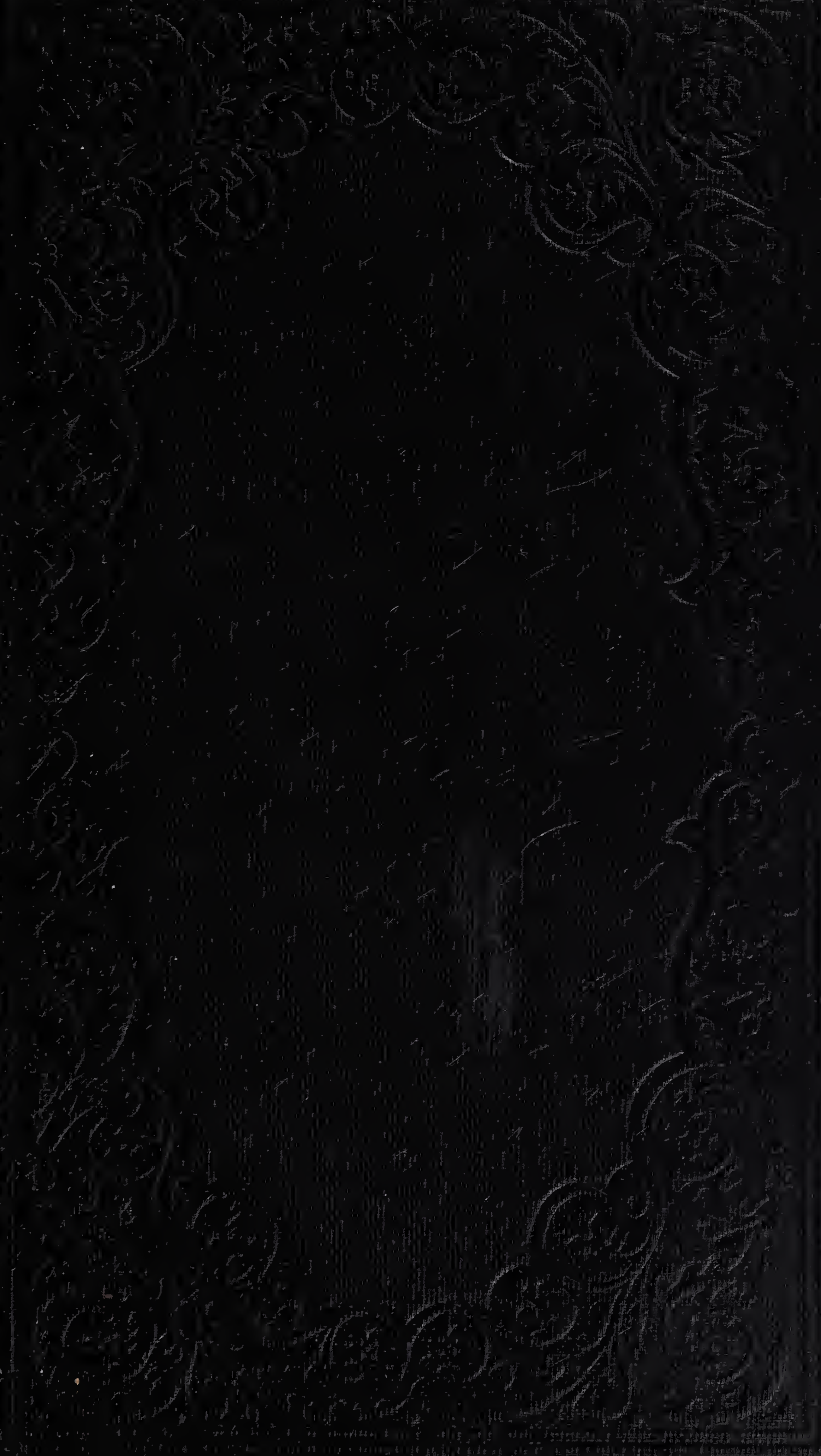

BRAITHWAITE'S RETROSPECT.

VOL. LXXXVIII. JULY—DECEMBER, 1883.

THE
RETROSPECT OF MEDICINE:

BEING

A HALF-YEARLY JOURNAL

CONTAINING A RETROSPECTIVE VIEW OF EVERY DISCOVERY AND
PRACTICAL IMPROVEMENT IN THE MEDICAL SCIENCES.

EDITED BY
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AT THE LEEDS SCHOOL OF MEDICINE, ETC.

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AFFECTIONS OF THE SYSTEM GENERALLY.

Acute Rheumatism.—In acute rheumatism, as early as possible in the case, give the mixture described below, in the diluted form in which I have prescribed it. Do nothing else, except to pack the painful joints in wraps of very loose cotton-wool, covered with light flannel; not oil-silk or any other vapour-proof material. ℞. Tincture aconiti (P.B.) ♏xii; ammonii sulphidi ♏xvi; aquæ menthæ viridis destillatæ ℥vj. The dose is a fourth part, every fourth, or, in severe cases, every third hour, until the pain is relieved and the fever has abated. The mixture should not be prescribed in larger quantity than will suffice for four doses, on account of the tincture of aconite, and, more especially, the tendency of the sulphide of ammonium to decompose and deposit sulphur. (Dr. J. Mortimer Granville, Brit. Med. Journal, April 7, p. 663.)

Oil of Wintergreen.—1. In the oil of wintergreen (acid methyl salicylate) we possess a most efficient salicylate in the treatment of acute rheumatism. 2. In its efficiency in controlling the pyrexia, the joint-pains, and the disease it *at least* ranks with any of the salicyl compounds. 3. The best method of its administration is in frequently repeated doses, continued in diminished doses throughout convalescence. 4. Its use possesses the advantages of being unattended with the occasional toxic effects, the frequent gastric disturbance produced by the acid or its sodium salt, even when prepared from the oil of wintergreen; that its agreeable taste, and finally its comparative cheapness, are further recommendations in favour of its employment. (Dr. F. P. Kinnicutt, Glasgow Med. Journal, Sept., p. 233.)

Cancer.—*Turpentine as a relief to Pain.*—In what way Chian turpentine affords relief I cannot pretend even to surmise. That too much has been claimed for it as a curative agent I fully believe, but that it is useful in some cases of cancer up to a certain point I have not the slightest doubt. So far as my small experience goes, it is useful merely as an anodyne; and even if its utility extends no farther than this, we should value it highly, for nothing can be more unsatisfactory than having to depend for the relief of pain on ever-increasing doses of opiates. One point in regard to the mode of administration is of considerable practical importance. In the form of pill, Chian turpentine is not very easy of solution, and in many cases in which the drug has been reported to be positively inert this fact may help to account for the negative results. A medical friend of mine found an undigested mass of these pills in the intestinal canal in the course of an autopsy. On this account, and also because there are many persons who are unable to swallow two large pills every four hours, I think that the essence, made by dissolving the drug in ether, is likely to prove a more desirable and more effective preparation. (Dr. A. S. Currie, Edin. Med. Journal, May, p. 999.)

DISINFECTANTS.—Prof. Koch has tested the ordinary disinfectants in three ways. 1. To ascertain whether a particular disinfectant is capable of destroying the resting-spores of bacilli which are the most difficult of all forms of life to destroy. No disinfectant can be safely trusted which cannot destroy the developing power of the resting-spores. The resting-spores of splenic fever were generally employed for experiment. 2. To ascertain how the disinfectant behaves in regard to more easily destructible fungi, such as yeast, bacteria, bacilli, and micrococci. 3. To ascertain whether the disinfectant is capable of arresting the development of micro-organisms in suitable nutritive liquids.—*Carbolic Acid* did not prove itself a sovereign disinfectant. A 5 per cent. solution only sufficed after two days to arrest the developing power of splenic fever spores; while a 1 per cent. solution destroyed in two minutes the bacilli themselves. A solution of 1 in 850 sufficed to check the development of the latter. Soaking five to seven times repeated, in a 5 per cent. solution of acid, was only sufficient to retard the development of the resting-spores. The fact is very noticeable that carbolic acid in oil, or in alcoholic solution, is absolutely without effect on the bacilli and spores. The latter, after remaining 110 days and 70 days respectively in a 5 per cent. solution of carbolic acid in oil and in alcohol, were repeatedly found intact. The same was the case with *Salicylic Acid* and *Thymol*. In the form of vapour, better results were obtained with carbolic acid, but only at higher temperatures. Even the action of carbolic acid vapour at 75° C. for two hours, failed to destroy the resting-spores completely. Chemical combinations of carbolic acid with other bodies, or cheap crude products containing carbolic acid, were less efficacious than the pure preparation. A 5 per cent. solution of zinc sulpho-carbolate destroyed the resting-spores in five days; a 5 per cent. solution of sodium phenate (carbolate) in ten days merely reduced their power of development, while sulpho-carbolate failed to do this within the same period of time. Crude wood-spirit, and pyroligneous acid in a concentrated state, destroyed the resting-spores in twenty days and two days respectively; while wood-tar and coal-tar, in a moderately concentrated condition, had no effect. (Prof. Koch, Practitioner, Nov. 1882, p. 374.)

ENTERIC FEVER.—*Antipyretics.*—Cold is, I think, our best antipyretic. Its use at the London Fever Hospital since 1870 shows a steady tendency to supersede other methods by the bath, to use colder water, and to shorten the time of immersion, until, with Dr. Cayley, we employed a temperature at starting of 60° to 70° F. for five minutes or less, except in obstinate cases. I have noticed long immersion (twenty to thirty minutes) cause some exhaustion, and render the pulse imperceptible—transitory effects, however. Our aim is to improve symptoms, probably by shock, and not merely to lower temperature, for which purpose quinine would be simpler, and, though slower, more prolonged. We have the bath, douche, compress, sponging, and pack. Compared with the bath, the douche alone produces such shock; the compress alone creates less mess and disturbance of the patient, and, though sure but slow in action, and useful where absolute rest is necessary (as in hemorrhage, &c.), it tends to produce hypostatic pneumonia by, as it is ordinarily applied, keeping the patient long on his back; none lowers temperature so quickly and certainly. Indeed, no single method is equal to the bath in potency and range of action; while with tact and familiarity movement of the patient may be reduced almost to *nil.* While in the bath the patient's head should be douched by some such means as a large and fully charged sponge. Its effects may thus be enumerated:—1. It reduces temperature at once; in exceptional cases colder water or longer immersion may be needed; 103° to 105° F. in the axilla is easily lowered to 96°—99° F., equivalent after a bath to a rectal temperature of 99°—101° F. In proportion, the axillary temperature falls less than the rectal immediately after the bath, and rises more after an interval. 2. It slows the pulse on an average by twenty beats a minute (except in cases in which it is but little quickened), steadies it, and diminishes dicrotism, and thus improves its tone. 3. It tends to moisten the tongue, improves the aspect of the patient, promotes the taking of nourishment, and courts refreshing sleep. 4. It restores consciousness and dissipates delirium, particularly when noisy, and especially if used with opium and brandy; and thus it saves nurses wearing labour and patients the discomfort, or worse, of physical restraint. 5. It causes forced inspiration, and, by expanding the lungs, lessens the tendency to hypostatic pneumonia. 6. It has seemed to prevent excessive diarrhœa, and to render abortive cases bathed from the beginning. On the other hand, it increases relapse, and patients rarely like it, but generally simply detest it. (Mr. W. Tonge-Smith, Lancet, August 25, p. 347.)

Fatigue, Drowsiness, &c.—*Green Leaves of the Erythroxylon Coca.*—In a pamphlet just published on this important drug by Mr. Thos. Christy, F.L.S., the writer gives an interesting account as to the efficacy of the fresh green leaves of this recently discovered therapeutical agent in combating fatigue and drowsiness, in allaying hunger, and in its beneficial effects upon the digestive organs. He also adduces cases in support of the antidotal properties claimed for it in the treatment of victims to the opium habit. Mr. Christy strongly recommends coca to medical men and nurses and all who require to keep awake and on the alert for many hours, as a means of enabling them to go through their duties cheerfully, merely by chewing the leaves. In support of his statements Mr. Christy quotes cases of delirium tremens, phthisis, indigestion, lumbago, and dipsomania, in which coca has been very successfully used, and he offers to send samples of the green leaves gratuitously to those medical men who are desirous of trying the effects of this drug on written application to his address, 155, Fenchurch Street, London. (Med. Press and Circular, May 9, p. 414.)

Gout.—*Stewed Fruit.*—For many persons—gouty, dyspeptic, and glycosuric—ordinary stewed fruit is objectionable from the amount of added sugar it contains. Where the acidity of fruit is masked or hidden by an excess of sugar, then the resultant product is cloying to many palates, and offensive to many stomachs. But it is by no means necessary to render stewed fruit objectionable by adding much sugar to it. Deprived of this excess of added sugar, stewed fruit can not only be rendered unobjectionable, but be converted into an actual prophylactic measure, especially in cases of lithiasis. In order to attain this end all that need be done is to neutralise the excessive acidity by an alkali, and then little or no sugar is required. Thrifty housewives have long been familiar with the fact that the addition of a small quantity of the bicarbonate of soda to stewed fruit reduced the acidity, so as to save the necessity for much sugar. This was done simply for economy. The principle has a far wider application. The amount of bicarbonate of potash required for each pound of fruit was found to be about as much as would lie upon a shilling. And this is a much better guide for a cook than to put so many grains. With all fairly ripe fruit this was just sufficient to neutralise the acidity, and bring out the natural sweetness; indeed the resultant product was quite sweet enough for most adult palates. Such stewed fruit could be eaten alone, or with milk puddings, or with cream, or the Swiss milk in bottles. Gooseberries, currants of all kinds, apples, and plums, all alike were excellent when so prepared. Where there is no natural sweetness to neutralise the acid completely by an alkali leaves nothing, simply a cold mass, to which the palate is absolutely indifferent, Such is the case with rhubarb. Here it is well to use half or all the amount of alkali with some sugar. The same is the case with early gooseberries before they have any natural sweetness; no sugar formed in them. Here the full quantity of alkali should be used, and the remaining acidity met by sugar. Where three-quarters of a pound of sugar is required to sweeten one pound of fruit, only one-quarter of a pound of sugar is necessary after the alkali has been added. The sour-sweet taste is thus secured, which is toothsome. Now, in these two instances the stewed fruit is only rendered less objectionable to the stomach plagued with acidity, not made quite inoffensive. But for ordinary gouty individuals not troubled with acidity of the stomach, such stewed fruit is quite admissible, and forms a pleasant method of taking potash. (Dr. J. Milner Fothergill, p. 194.)

Leprosy.—Surgeon-Major Peters has contributed to the Edin. Med. Journal the results of his experience in the treatment of this dire malady at the Leper Asylum at Belgaum during two years. The treatment may naturally be considered under two heads, viz.: 1. *Local Applications.*—For the ulcerated parts an emulsion of gurjun oil is most strongly recommended. Dr. Peters claims for it that under its use the ulcers heal rapidly; and that the cicatrices never give way when once formed; that by its use the skin is kept soft, and cracking prevented. Moreover, flies avoid people who are using this ointment. Failing this, he recommends carbolic oil (one in 40), but it is more expensive, and not so efficacious in healing the ulcers. For the tubercular form of leprosy Dr. Peters considers that we have a potent remedy in the cashew-nut oil, the application of which to the tubercles causes them to soften and break down into ulcers. These are then to be filled with gurjun oil. When they are healed over, if there is any thickening left, the whole process should be repeated. In the anæsthetic form the cashew-nut oil may also be used, being spread over the affected areas. 2. *Internal Remedies.*—Chaulmoogra oil would seem to be almost a specific, for not only does it alleviate the dyspeptic symptoms so commonly present, but it also causes absorption of the tubercles. Iodide of potassium was found useful in cases where there was reason to suspect association with syphilis. In regard to diet, the patients should be well fed, and have fresh meat, fresh fish, and vegetables. Salt meat and salt fish should be most vigorously shunned, although in none of his patients could the disease be attributed to the use of salt fish as an article of diet. It would appear that grain is often damaged by damp after being stored up in granaries, and Dr. Peters considers that this unwholesome grain is quite as capable as unwholesome fish of giving rise to leprosy. In several of his patients the disease was distinctly hereditary, whilst in some no cause for it could be assigned. (Med. Times and Gazette, March 31, p. 361.)

MALIGNANT (HEMORRHAGIC) SCARLATINA.—*Crotalus.*—In two very severe cases of malignant scarlet fever, which seemed hopeless, Dr. Hayward tried crotalus. In the first case he says: It was now only about thirty-six hours since the beginning of the attack, but the case was apparently hopeless under the ordinary treatment. It was therefore determined to try the power of crotalus, which had been much recommended in the treatment of putrid and hemorrhagic diseases when introduced subcutaneously as well as by the mouth. The cuticle was consequently removed from round the throat by a cantharides blister, and to the exposed cutis a wet compress sprinkled with crotalus was applied, and renewed at first after half an hour and then every three hours, also a dose dissolved in a teaspoonful of water was dropped on the tongue every half hour. The effects were watched anxiously. There was no more retching after the first application of the crotalus to the denuded cutis, even when teaspoonfuls of beef tea were put into the mouth; but the restlessness, pulse, and other symptoms continued much the same all the evening. During the night she gradually grew less distressed and dozed at intervals; towards morning she really slept, and the breathing gradually became less laboured and irregular, and on being roused for some medicine, she opened her eyes, and, seeing her father at her bedside, exclaimed, "Oh, pa!" as if only just then realising his presence. By eight o'clock in the morning of October 8th the pulse could be distinctly felt, and was only 120, the respiration was becoming easy, the head was less thrown back, and the struggle appeared to be turning in her favour. The rash was now freely out on the body and legs, but it was of a purple colour. The same medicine was continued internally, but now only every two hours, and the crotalus was no longer sprinkled on the compress. During the day of October 8th the rash gradually brightened in colour, and all the distressing symptoms receded rapidly, so that by evening she was able to drink with but little difficulty or pain; the respiration was almost normal and the pulse was 100, and had gained considerably in force and fulness. She slept well during the night, and the next day—that is, October 9th—her appetite began to return, and she looked wonderfully better, the change being really marvellous. From this date her recovery went on rapidly and steadily. The cuticle exfoliated rapidly, so that by the aid of vinegar baths and lard inunctions the skin was about natural on October 14th. She was attacked on the 5th, nearly dead on the 7th, crotalus treatment was begun on the morning of the 7th, it rallied her almost immediately, and she recovered so rapidly that a very favourable prognosis was given on the 8th, and she was well on the 14th. The notes of these interesting cases were written at the time, and have been withheld from publication in order to test the drug in similar cases before publishing them. This has now been done over and over again, until the writer is thoroughly convinced that the above facts were no mere coincidences, and he now lays them before his colleagues in the hope that the drug will be used in similar cases, for which hitherto there has been no adequate remedy. (Dr. J. W. Hayward, Liverpool, Lancet, July 14, p. 54.)

Toxic Effects of the Salicylates.—*Use of Ergot to counteract.*—Schilling, in a recent memoir, states that he has observed, after the administration of rather strong doses of the salicylates (ʒ iss to ʒ iiss. per diem, ℥ij to ℥iij. in all), lasting troubles of audition, the tympanum being thickened. One patient, who took on two consecutive days the massive dose of thirty grains of sulphate of quinine, became subject to ringing in the ears with marked deafness. It is not at all rare to observe these troubles of audition after the administration of large doses of the salicylates or of sulphate of quinine; they are attributed to hyperæmia, brought about by the vaso-paralytic action of the remedies. To obviate this vascular paralysis, Schilling has the idea of administering ergot in connection with these drugs: ℞. Ergotine, gr. xv., vel., ext. ergot. liq. in proportionate dose; sodæ salicylat., ʒ iiss; aquæ, ℥vj. M. S. Tablespoonful every hour. Out of eighty-seven patients who took the salicylate in this form, three-fourths did not suffer at all from ringing in the ears. In the same way nine others took sulphate of quinine, one gram to one and a half of ergot, without any troubles of audition. It would seem also that this association of quinine and ergot prevents the development of the amblyopia, which sometimes supervenes after the administration of large doses of quinine. (Schilling, Glasgow Med. Journal, Sept. p. 233.)

Zymotic Pyrexia.—*Inhalation of Ammoniated Chloroform.*— Recently I have recurred to my original plan of administering chloroform vapour in combination with ammonia vapour in cases of zymotic fever, and as I have now made the administration exceedingly easy in practice, and as it seems to promise valuable results, I wish in this note to describe the method. I take an alcoholic solution of ammonia (838 alcohol saturated with ammonia) and mix it in equal parts with chloroform or methylene bichloride. When the solutions are mixed, any separation of water that may occur is removed, and in this way a clear mixture of ammoniated chloroform is obtained ready for use. In administering this compound by inhalation of the vapour, I put two fluid drachms of it into a small Wolf's bottle, and connect the bottle with a leather inhaler armed with an expiratory valve. The mouth-piece of the inhaler is held close to the mouth and the patient is instructed to inspire until bubbles of air are drawn pretty freely through the fluid in the bottle. The inhaler is in this manner charged with the vapours which are drawn into the lungs. From the first the ammonia vapour i deprived of much of its pungency by the presence of th chloroform, and in time, as the narcotic begins to take effect the pungency of the ammonia is covered so effectually tha larger quantities of it can be inspired without cough or irritation. During the past week, in a puerperal case under th care of my friend, Dr. Rogers of Berners-street, in which suggested this method in consultation, the patient inhaled freely every two hours for three days without the slightes discomfort and with obvious direct advantage. The effect of the inhalation seem to me to extend in four directions :— 1. Under the sedative action of the narcotic relief from pai is obtained and repose, if not actual sleep, is secured 2. Under the combined influence of the vapours there reduction of temperature. 3. Under the influence of th ammonia there is a sustained fluidity of the blood and a production of freedom of secretion. 4. Under the action of th combined vapours there is an antiseptic result which is alwa favourable. (Dr. B. W. Richardson, p. 154.)

AFFECTIONS OF THE NERVOUS SYSTEM.

Chorea.—*Succus Conii.*—Drs. Clifford Allbutt, Eddison, and Churton have obtained good results in the treatment of chorea, with violent movements, by large doses of succus conii. The patients took from ʒ ij every hour to ℥ss every four hours during two or three days. It was given sometimes alone, sometimes in combination with morphia or bromide of potassium. It seems that the best results are obtained by large doses at first, until the system is thoroughly under its influence, when smaller doses, frequently repeated, will keep up its action. No toxic effects were ever noticed in these cases. The cases seem to show: 1, That the drug, to be of any service, must be given in large doses; 2, that its action must be sustained by frequent repetitions of the dose at short intervals. The uncertainty of the action of given specimens of succus conii necessitates great care in its administration, and tells against its general adoption. But cases in which neither chloral nor morphia have any effect may arise, and in which, as in the above, succus conii may prove efficacious. (Lancet, May 26, p. 905.)

Divided Nerves.—*Use of Sutures to Unite.*—Esmarch's bandage having been applied, the lower end of the nerve was easily found under the scar; the upper one, which seemed to have retracted, was discovered by a little dissection. It terminated in a large bulb, larger than a common pea; the other end was somewhat atrophied. The two ends were rather more than an inch apart. A little was taken off the lower end of the nerve, so as to refresh it, and a portion (but not the whole) of the bulbous upper end was removed. Then, on extending the limb, it was found possible to draw the ends of the nerve together, and a catgut suture was put through the sheath on one side and a suture of fine silk on the other, avoiding the nerve-fibres as far as possible. Examination of the portion removed from the bulbous end showed marked increase of endoneural connective tissue pressing upon and constricting the nerve fibres, and atrophy of some of the latter; no fatty degeneration. The operation was performed antiseptically, and the wound united by first intention. On March 14 it is noted, "There is a tingling sensation experienced in the arm, localised to no particular area," and on March 15, "There certainly seems to be some power of extension returning, for with the wrist held tight to the splint he can make slight movements of extension of the fingers." A few days later it was thought that the sensation at the back of the hand was more perfect. This, however, was dubious. He then left the hospital at his own wish, and nothing more was heard of him till March, 1883, two years after the operation, when he returned to show how completely he had recovered. There is now no perceptible difference between the two arms, though perhaps the affected arm (the right) is somewhat less muscular than it would naturally be. Sensation, however, is perfect, and all the movements of extension of the wrist and fingers are performed as well on one side as the other. He says that it was about a year before the improvement was very obvious to him; but then it began to amend rapidly, and now he uses the limb as well and easily as before the accident. A question is often raised in this operation as to the method of passing the sutures, whether through the tissue of the nerve itself or through the sheath only. I think all that we need say on this head is that the sutures should have a firm hold; whether they be passed through the thickness of the nerve or not seems of little consequence. In only one of the thirteen cases referred to as quoted by Tillmanns was the precaution taken of including only the sheath in the suture. The material of the suture is probably a matter of some importance. Catgut is unirritating, but it is not sure to hold beyond a few days, so that it seems a good plan to reinforce the catgut suture with one or two of fine silk (as in my case) or horsehair. It does not seem necessary to remove more than a very small portion of either end of the nerve. In the above instance I purposely took away very little, in order to obviate tension as much as possible. Had the separation between the cut ends been less, I should have liked to excise the whole of the bulb on the upper, and all the wasted part of the lower, end; but I thought it better under the circumstances to remove very little, and the result justified the course adopted. (Mr. T. Holmes, p. 162.)

Exhausted Nerve Function.—*Small Doses of Medicines.*—I could give examples of the excellent results that may be obtained from a persevering use of very small doses (one-fiftieth of a grain) of strychnia in promoting the restoration of exhausted nerve function, while larger doses do but add to irritation and eventually increase the exhaustion. The doses of many medicines as set forth in books are often needlessly large, when we seek, not an eliminant or evacuant effect, but a gradual alterative or specific action from the remedy. There is probably no medicine regarding the definite action of which physicians agree better than iron; but is it necessary for the cure of facial neuralgia to give an insoluble powder like the hydrated oxide of iron in a dose ranging from thirty grains up to three or four drachms? (Dr. J. C. Thorowgood, Med. Times, June 30, p. 725.)

MELANCHOLIA, WITH SLEEPLESSNESS. — *Cannabis Indica.* — Medicinally, I have cause to be thankful to cannabis Indica. A relative of my own took it regularly for six months, with bromide of potassium, every night, with the effect of removing acute bodily torture and mental anguish completely for the night. Dr. Clouston, some years ago, recommended large doses of cannabis with bromide of potassium in mania. Although I have had no personal experience of it in acute mania, in cases of melancholia, and, indeed, in all cases of mental depression with sleeplessness, I have found a valuable and almost certain ally in this drug. Half a drachm to a drachm of bromide, with a grain or two of the extract, or from twenty to thirty drops of its tincture, seldom fails in the object we have in view. It dulls the feeling of anxiety, relieves the depression, and gives restfulness, if not sleep. Hyoscyamus may be usefully combined if there be any visceral pain or disturbance. A woman, in acute melancholia, said to me, "Doctor, I must kill my children. Send me to an asylum." I answered, "Will you promise not to kill them until I have tried the effect of one medicine upon you?" She thought she could promise. A drachm of bromide of potassium, with half a drachm of tincture of cannabis, two or three times a day, in a fortnight caused so much improvement, and even cheerfulness, that she declared she could now see the window open without the almost irresistible desire to throw her children down on to the pavement, which had possession of her whole mind before. I think that this drug is seldom given in large enough doses. My usual dose is a grain of the extract, or from twenty to thirty minims of its tincture. (Dr. W. Strange, Brit. Med. Journal, July 7, p. 14.)

NEURALGIA AND RHEUMATISM.—*Franklinisation.*—The author has tried the effects of static electricity on twenty patients, suffering from various reflex and rheumatic neuralgiæ or muscular rheumatism. The 'franklinic currents' of all degrees were supplied by a Goltz's friction machine; all the patients were left uninsulated and franklinised during from five to fifteen minutes at a sitting, by the positive pole alone. The conclusions the author arrived at are as follows. 1. The sensation of the franklinic current is different from that of the faradic and galvanic. The weak currents cause a burning sensation, the strong ones a sensation of concussion or stroke, at the point where a spark is produced. 2. The electricity distributes itself all over the body, and, during a sitting, sparks may be produced by contact at any desired point of the surface. The strength of a spark lessens with the increase of distance from the franklinised point. 3. The skin, at the point of franklinisation, at first becomes red and anserine, then pale and nearly white; an artificially produced erythema disappears. 4. The general functions undergo some considerable changes; the heart's reaction shows retardation (four to twelve beats less in a minute); the pulse becomes fuller; the respiration deeper and slower; the quantity of urine voided after a sitting is often considerably increased. 5. The most striking changes, however, are observed in parts affected with neuralgia or rheumatism. Immediately after a sitting, pain and tenderness disappear, and, during the remaining part of the day, the patients feel much better than before a sitting. Each successive franklinisation brings a further decrease of intensity of neuralgia. In cases of short standing, three or four sittings suffice to completely remove the agonising pains. Ten to fifteen sittings cured even cases of neuralgia of twelve years' standing, which had obstinately resisted galvanisation, faradisation, and all possible therapeutic means. In each of the author's cases either complete cure or very considerable improvement followed. 6. There is no necessity to undress a franklinised patient, as the therapeutic effects of this excellent agent remain unchanged—a circumstance of practical importance in female cases. The author enthusiastically joins Prof. Charcot and Dr. Morton in their expectations of a good therapeutic future for static electricity, (Dr. V. J. Drosdoff, St. Petersburg, Medical Record, Nov. 15, p. 452.)

Neuralgic and Rheumatic Pains.—Chloral Hydrate as a Vesicant.—Dr. Ritter states that some three years ago he accidentally discovered that when powdered chloral, sprinkled upon ordinary adhesive plaster and melted by a gentle heat (not more than enough to cause the plaster to adhere to the flesh), is applied while warm to the part where the blister is wanted, within three minutes a gentle heat is felt, increasing in intensity for about three minutes more till it is like a burn, then gradually easing off, until, at the end of ten minutes, the parts feel free from pain. The secondary effect is soothing; in some instances within half an hour a second burning is felt, though not so intense as at first, nor so lasting. If, at the end of ten minutes, or as soon as pain has subsided, the plaster be taken off, the surface is as effectually denuded as by a cantharidal plaster after six hours, though the discharge is not so great. Thus, within ten minutes the work of an old-fashioned blister is accomplished; and the great advantages of the chloral plaster over the cantharidal are:—1st. Its rapidity of action, thus relieving pain, and producing the counter-irritation upon an engorged organ before the congestive action has had time to pass into more than the congestive stage. 2nd. Its ease of application. 3rd. It need never be taken off to have the blister dressed; but the original plaster may remain until the sore is entirely healed, and the plaster loosens and comes off itself. Dr. Ritter says he would have given his experience to the profession before as to the property of chloral hydrate, but supposed it well known. The employment of chloral hydrate, somewhat as used by Dr. Ritter, was recommended some years ago for the relief of neuralgic and rheumatic pains, &c., and has been successfully employed for such purposes by the reporter. Usually the ordinary emplastrum roborans was sprinkled over with powdered chloral and applied to the affected part. When taken off, after the lapse of from 24 to 48 hours, the skin is generally found studded with vesicles. These are to be pricked and a simple ointment applied, or preferably, the plaster may be left on. (Dr. G. F. Duffey, Dublin Journal of Med. Science, June, p. 543.)

NERVOUS DISEASE ASSOCIATED WITH INSOMNIA.—*Acetals.*—Diethylacetal ($C_6H_{14}O_2$) has been recently represented by von Meering as an excellent substitute for chloral. It is a fluid of bitter taste, slightly hot, soluble in eighteen times its volume of water, and mixes in all proportions with alcohol. Its boiling point is 104° F., and specific gravity 83. Experiments made on frogs and mammals prove that the acetal acts upon the central nervous system, whose functions it suspends, commencing first with those of the cerebral hemispheres, and thence descending but paralysing respiration before stopping the cardiac action. Six out of eight human subjects experimented upon wers sent to sleep in the course of the day after a dose of from ten to twelve grammes. No unpleasant after effects were noted in any instance. The time required before sleep set in is not mentioned. M. Stolenhoff has also made some observations, which in the main agree with the above conclusions. He employed the acetal in different forms of nervous disease, associated with insomnia (Central für Ner Nervenheilkunde, No. 6). M. O. Berger of Breslau has not met with corresponding success. In none was sleep lasting more than two hours produced; in many no effect was observed; in some giddiness, flushing of face, and vomiting were recorded. Leyden of Berlin has been even less fortunate. It is possible that the composition of this drug—ethylidene diethyl ether, $CH_3CH(OC_2H_5)_2$—has not been uniform in every case. (Lancet, Aug. 25, p. 344.)

NEW ANODYNE.—*Jamaica Dogwood.*—We have received from Messrs. Sumner and Co., of Liverpool, specimens of dogwood bark and of their fluid extract of Jamaica dogwood. Preparations of this drug have long been familiar to us, having been introduced to the notice of the profession some years ago by Messrs. Parke, Davis, and Co. of Detroit. The piscidia erythrina, erythrina piscipula, or Jamaica dogwood, belongs to the natural order Leguminoseæ. It is a native of the West Indies, and, as its name implies, the chief source of supply is from Jamaica. When fully grown the tree attains a height of from twenty to twenty-five feet. Judging from the specimens before us the bark occurs in pieces from two to four inches in length, from one to two inches in breadth, and about one-eighth of an inch in thickness. The fluid extract has an agreeable ethereal smell, a pleasant taste, and becomes milky on the addition of water. It is said to be a powerful anodyne and one of the best remedies for neuralgia. In many instances it is reported to have relieved pain and ensured sleep after the failure of opium, chloral, and many other remedies. We have taken it in full doses, and have used it largely clinically. It is sometimes useful, but it is not likely to supersede opium, at all events not at present. (Lancet, Aug. 25, p. 343.)

New Hypnotic.—*Paraldehyde.*—Every addition to our resources in the direction of safe and efficient hypnotics is especially desirable. We owe to our Italian colleagues this new contribution. It may be desirable to put before our readers some exact information regarding the physical and chemical qualities of this substance, especially as it is likely to enact so important a *rôle* in the therapy of the future. Paraldehyde is a polymeric modification of aldehyde. What is aldehyde? This is, in brief, alcohol deprived of its hydrogen, and although a generic term applied to a group, in this connexion means acetic aldehyde. Paraldehyde being merely the same substance in respect to its atoms, but which are arranged differently, may be suspected to have analogous properties. Above the temperature of 51° F. it is a colourless liquid, having a peculiar odour, and a specific gravity of ·998. It boils at or about 225° F., and it is soluble in 8 parts of water at 52° F. Aldehyde acted on by chlorine is converted into chloral. These chemical facts indicate the position of paraldehyde from the physiological standpoint, and probably suggested its utility as a hypnotic. For medicinal administration, the dose ranges from ʒ ss. to ʒ ijss., and it is said the best results are had from the maximal dose. In the trials made of it, paraldehyde has proved to be an admirable hypnotic, possessing most of the qualities but none of the dangers of chloral. It acts first on the cerebral hemispheres, and causes torpor without the preliminary excitement so common in the action of the sleep-producing class. After the hemisphere, the action extends to the medulla oblongata, and then to the cord. A lethal dose suspends the functions of the medulla and the respiratory centre, and the action of the heart ceases after the respiration. In respect to the effect on the heart, paraldehyde is far safer than chloral; indeed, it appears to be free from the danger which renders the administration of chloral in large doses so doubtful an expedient. Its effect as a hypnotic is not so persistent as that of chloral. but it may be maintained by the repetition of sufficient doses, No ill-effects of any kind—no after-nausea, or depression, or headache—have been observed to follow its very free administration. Paraldehyde may be prescribed as a hypnotic in the various conditions usually requiring such a remedy—in fevers, rheumatism, gout, prurigo, &c. (Morselli). It is, however, in mental and nervous disorders that it will probably be most used. By the Italians, Albertoni, Morselli, and others, it has been prescribed with very marked success in acute mania, in the wakefulness of dementia paralytica, in hysterical paroxysms, and in insomnia arising under ordinary conditions. They have found it especially useful in that form of wakefulness caused by the fear of inability to sleep. Surely if these statements be confirmed, an important remedy has been discovered in paraldehyde. (Dr. G. F. Duffey, Dublin Journal of Med. Science, Sept., p. 254.)

SCIATICA AND LUMBAGO.—*Injection of Sulphuric Ether.*—The successful results I have invariably found attending this system of treatment, which I have adopted for the last four years with my rheumatic patients, have decided me to give publicity to the course from which I have seen so much benefit derived. Its plan is simple enough. After preliminary dry-cupping over the seat of lesion, I inject subcutaneously ten minims of sulphuric ether, gradually increasing it till I have injected thirty minims (assuming I find no marked progress in the course of a week of treatment above named). I have found it advisable to precede this by a brisk purgative at the outset, and to administer a mixture containing five grains of salicylate of soda in an ounce of infusion of gentian every two hours, concurrently with internal and external applications. In not one case have I yet found this curative system fail; but in about a week's time, usually, the patient is cured. Sufferers from lumbago have come to me nearly bent double with pains in the lumbar region, and have walked away erect and free from their distresses after dry-cupping. I have seen sciatic patients come in limping, and go out free from the least indication. I can especially instance the case of one patient, an old man, who had been the round of all the London hospitals, to no avail, for nine years previous to his consulting me. He had been given up by all as a hopeless case. On my asking whether he was willing I should try a method of treatment on lines hitherto unattempted, and on his consenting to the same, I pursued the system of subcutaneous injection already described until I attained the administration of a drachm of sulphuric ether. Marked improvement followed this course, which I, however, was obliged to suspend owing to the formation of a hard cicatrix over the seat of the sciatic nerve. Nevertheless, after this was removed, the patient ultimately found himself completely recovered, and, during the five years which have elapsed since he first came to me, has sustained but one attack of sciatica of a very slight character. I sincerely hope these few remarks on my own practical experience of this system of treatment of cases the persistency of which so frequently baffles the efforts of the most experienced practitioners may prove of some practical utility in similar cases. (Mr. J. Brindley James, Brit. Med. Journal, March, p. 511.)

SEA-SICKNESS. — *Bromide of Sodium.*—Of all the drugs used, I found that the most effectual was bromide of sodium. When bromide of sodium is given in doses of 10 grains three times a day, the attacks entirely subside, the appetite improves, and the patient is able to walk about with comfort. In all cases of sea-sickness, it is very desirable that the patient should take sufficient food, so that at all times the stomach may be comfortably full, for by this means, overstraining during fits of retching is prevented, and the amount of nausea is diminished. The practice of taking small pieces of dry biscuit is not of much use; as, although the biscuit is retained by the stomach, yet the amount taken is never sufficient to comfortably fill the stomach. Soups, milk puddings, and sweets are to be avoided, as they increase the desire to be sick, and are followed by sickening eructations. Fat bacon is easily borne, and does much good, if only the patient can conquer his aversion to it. When taken in moderate quantity, it acts as a charm, and is followed by very good results. But of all food, *Curry* is the most useful in sea-sickness, and is retained by the stomach when all other food has been rejected. Next to curry, I would place small sandwiches of cold beef, as they look nice on the plate, and are usually retained by the stomach. In conclusion, I would advise that brandy should be used very sparingly, as, in many cases, it induces sea-sickness; and its chief use is confined to those cases where the prostration is very great, and even then, champagne is more effectual. (Mr. T. M. Kendall, British Medical Journal, July 7, p. 12.)

Sea-Sickness and its Prevention.—Strong Coffee.—From twenty-five years' personal experience, and from that of scores of friends and patients, I think I may say that I have discovered a very simple means of preventing sickness, in most cases, in short voyages. This preventive remedy is merely the ingestion of strong coffee some time before embarking. I discovered the influence of strong coffee quite accidentally. A quarter of a century ago I was travelling on urgent business from Paris to London, and on arriving at Folkestone found that I had an hour or more to dispose of. I went into a *café*, and ordered a cup of *café noir*, the strong black coffee frequently taken on the Continent, with sugar only; this cup I repeated. The weather was awful, the sea tempestuous, nothing but dire necessity would have induced me to start, and I expected to be ill in five minutes, being a wretched sailor. To my utter astonishment I remained perfectly well throughout a tedious and very rough passage. Indeed, I think I was the only passenger on board who was not ill. This circumstance made me think that perhaps it was the strong coffee that was the cause of the immunity, and subsequent experience has proved that such was the case. To succeed, however, certain precautions are necessary. The coffee should be taken long enough before embarking to ensure its absorption; say one hour, if alone with sugar, about two hours and a half, if with milk. Moreover there should be nothing whatever in the stomach; nothing for the stomach to do. To prevent exhaustion, however, a good easily digested meal should be taken about four hours before embarking. The coffee also should be good and strong, unmixed with chicory, otherwise it produces no effect. If sickness ensue and food be thrown up, the conditions necessary, according to my experience, to secure immunity have not been secured, and the non-success is not a real failure. I consider that an infusion of about an ounce and a half of pure coffee-powder is about the quantity necessary. It should be infused (medicinally) in about four ounces of boiling water for ten minutes, say in a warm mug or jug, poured off and drunk with sugar as *café noir*, an hour before leaving, or as *café au lait* (with milk) two hours and a half before. It is best made at home, and put in a bottle, to avoid chicory or English wish-wash. Contrary to the generally received opinion, I do not think that the stomach being full on going on board is a prevention against sea-sickness. In my experience I find that it promotes and causes it. The poor stomach, full of food, buffeted about, refuses to do its work, and in desperation rejects its contents. I have been at sea nearly a hundred times since then; thanks to the coffee, I have scarcely ever been sick on short journeys (under ten or twelve hours), and very many persons to whom I have recommended the plan have enjoyed similar immunity. The influence must be that of a brain and nerve-tonic, which strengthens the sympathetic nervous system and renders it less impressionable to liquid shocks. I have published elsewhere the opinion that sea-sickness is probably due, in a measure, to disturbance of the circulation by the irregular motion, and to its influence on the sympathetic nerves. All the blood in the body is irregularly banged about by the motion of the vessel in a rough sea. Animals at sea for the first time are as ill as ourselves, especially dogs, and it cannot be fear, for on land fear does not produce sickness with them or with us, unless very exceptionally. On longer journeys, I advise travellers still to take the coffee in the same way, and then to lie down in their berths. The influence of a strong dose of coffee on the nervous system lasts for eight or ten hours. During this time, the body may become accustomed to the motion of the ship. They had better, I should say, take no food, either liquid or solid, until the feeling of thirst or of hunger show itself. For the first (thirst), a mineral water, soda or Apollinaris, with or without brandy or champagne, may be sipped. For the second (hunger), *café au lait*, with or without a little bread, may be taken; and, that agreeing, curry, as advised by Dr. Kendall, could be tried. In the continued sickness of long voyages, many patients of mine have derived immense, and often permanent, relief from the injection into the rectum at night of 15 or 20 drops of laudanum, in an ounce and a half of warm water, to be retained, by means of a small elastic baby injection-ball. If not retained, it can be repeated in half an hour or an hour. Sleep is generally obtained, even in extreme cases; and, during sleep, the body may become accustomed to the motion, as will coffee. Some patients have told me, or written to me, after long voyages, that this mode of employing laudanum has saved their lives. I have proposed, as have others, the hypodermic injection of morphia; but I have no personal experience of its use, and cannot say whether or not it acts better that the injection of laudanum *per anum*. When on board ship in short passages, I am generally too fearful of personal sickness to be of much use to others, feeling it prudent to remain perfectly quiescent; and I have not made any very long sea-voyages. Probably strong tea, brandy, wine, indeed any powerful nerve-stimulant or sedative, would have the same effect as coffee if taken in the same manner—that is, sufficiently long before going on board to be absorbed, and to leave the stomach empty and quiescent. Clearly, the usual non-success of remedial agents taken for sea-sickness is owing to the stomach itself refusing to absorb what is put into it, once sickness has commenced. A glass of pure water, instead of being absorbed in a few minutes, will often be thrown up an hour or more afterwards, just as it was taken. I have often known chloroform thrown up half an hour or more after its ingestion, perfuming the ship with its odour. The rectum is not sick, and has not lost its power of absorption. A naval surgeon, who had passed a life at sea, once told me that what he had found of most benefit in confirmed desperate sickness was drinking constantly warm or lukewarm water. A jug of warm water and a glass are placed beside the patient, who is told to swallow half a tumblerful when the sickness comes on. It is immediately thrown up, but easily, and by-and-by calm comes. The real remedy, however, is to stay on land, or to return there, if possible; but the coffee plan judiciously carried out has shorn the Channel of its horrors in my case, and in that of many others. (Dr. J. H. Bennet, Brit. Med. Journal, Aug. 11, p. 270.)

SYNCOPE OR COLLAPSE FROM ACCIDENT OR OTHERWISE.—*Hypodermic Injection of Ether as a Restorative.*—With reference to the hypodermic injection of ether in cases of cholera, I beg to suggest that such treatment has also a most marvellous and speedy effect in stimulating or reviving patients who are suffering from syncope or are in a state of collapse, whether it be due to shock from accident or otherwise; and I suggest that house surgeons and dentists, and, indeed, all who meet with similar cases, should always have at hand a suitable syringe and the ordinary anæsthetic ether. I pointed out in your columns, some time since, the almost instantaneous effect of this treatment in reviving patients who suddenly become prostrated, either from a protracted operation or from shock during its performance, notwithstanding the patient may be already saturated, so to speak, with ether, and when other measures have effected no good result. A drachm may be safely regarded as a medium quantity, which may be repeated again and again at very short intervals if necessary, but only, of course, in the case of an adult. It is as well to use a glass syringe capable of holding more than a drachm, say two, and one which has a piston with a sliding action and not a screw, otherwise some difficulty will be experienced in charging the syringe on account of the volatility of the fluid. I may add that Messrs. Wright and Co., of 108, New Bond-street, are makers of such syringes. (Mr. R. F. Benham, Lancet, Sep. 1, p. 395.)

I am desirous of adding my testimony to the value of ether subcutaneously injected. I have used it for some years with good results, and in some cases, as in the one detailed below, with marvellous success. In March, 1877, I was asked to meet Mr. H., of Croydon, to see Mr. J. B., aged about forty-five, suffering from typhoid fever in its last stage (I think the fifth week of the attack). I found him in a state of muttering delirium, pulse scarcely to be felt, picking the bedclothes with his fingers, sinking down in the bed, &c. His tongue was black and quite filled his mouth; lips swollen and covered with black sordes, and very pinched and exhausted aspect. It was quite evident there was no possibility of giving any medicine by the mouth in his present state. I therefore suggested to Mr. H., that we should inject ether. He agreed to the proposal, so, as I had brought both syringe and ether with me, I proceeded to inject twenty drops deep into the muscular tissue of the right thigh, to be repeated every four hours. We arranged to meet for another consultation on Monday (this being Saturday) if the patient were still alive, when, meeting Mr. H. on the Monday and asking after the patient, he said, "Oh! he's all right, and sitting up in bed drinking a glass of champagne." His tongue was clean, and, in fact, he was what is called "out of danger." He made a quick recovery without a drawback, except tenderness and pain in the soles of his feet, which he has had for months. I think there can be no doubt that in this case the ether had a marvellous effect. From the recollection of this case I have determined to use ether, or perhaps some other acid subcutaneously should cholera come under my care. (Mr. J. Lacey, Lancet, Aug. 18, p. 313.)

AFFECTIONS OF THE CIRCULATORY SYSTEM.

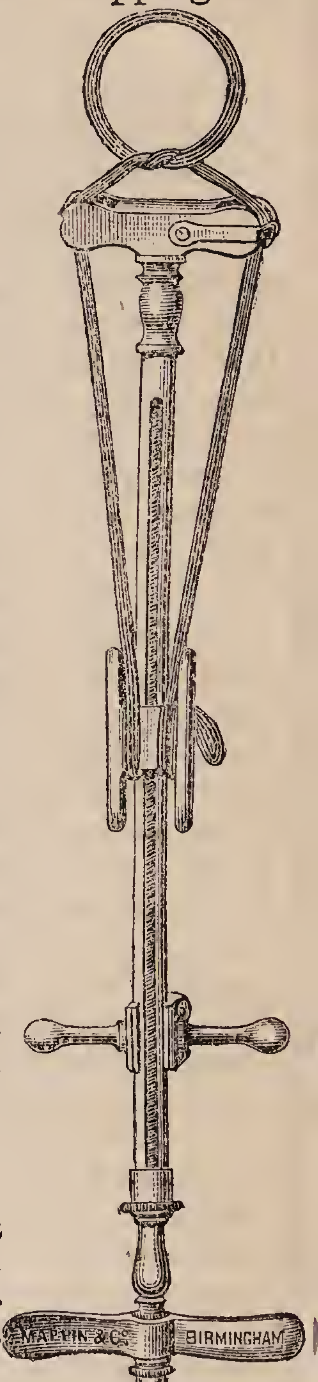
ANÆMIA.—*Iron, Phosphorus, Arsenic.*—Most physicians have learned to distrust iron, in whatever doses and under whatever form, as a remedy in idiopathic anæmia. In fact, this is one of the differences between it and chlorosis. Wine, animal food, quinine, and the other so-called tonics have generally proved equally useless. Phosphorus has been recommended for this as for some other cachectic states of uncertain origin. Like other physicians, I have given it, as I believe, without prejudice, and like others, have not seen advantage from its administration. In one case, in which it was fairly tried for several weeks and in increasing doses, it was thought by the patient to do harm, but this was probably not the case. Another powerful drug, arsenic, has been used, both in this country and in Germany, in various forms of obstinate anæmia, especially in Hodgkin's disease. In these last cases its administration internally has been sometimes (and apparently with occasional benefit) combined with injection of an arsenical solution into the enlarged lymph glands. But arsenic is not even mentioned in the monographs of Müller and Eichhorst as a remedy in pernicious anæmia. The merit of using it to good effect in this intractable disease is due to Dr. Byrom Bramwell. (Dr. P. H. Pye-Smith, p. 168.)

Angina Pectoris.—*Nitrous Compounds.*—Nitrous acid in any combination, whether as an ether or a metallic salt, is useful in the treatment of angina pectoris; and, in the case of the nitrite of amyl, the action of the acid is aided by that of the base. On the other hand, all compounds of nitric acid, whether ethereal or metallic, are without effect, unless it so happen that the constitution of the nitrate is such that it decomposes in the body with the liberation of nitrous acid. Further, nitro-substitution compounds have likewise no remedial effect. So far as at present known, the nitrogen-containing remedies for angina pectoris may be divided into two classes, the one consisting of combinations of nitrous acid with metallic oxides or alcoholic radicals, the other comprising a peculiar class of nitric ethers, obtained from the higher alcohols, whose decomposition within the body results in the production of nitrous acid. In both classes the action of the compound is ultimately dependent on the nitrous acid present. Typical examples of the first class are nitrite of sodium and nitrite of ethyl, and, of the second class, nitro-glycerine. To these classes might be added another containing such substances as compounds of amyl, whose action is similar to that of nitrites. But, limited as this group at present is to compounds of amyl, it is not one to be chosen in the treatment of angina pectoris. The dose required is large, and the action is not rapidly produced, and disagreeable after-effects are apt to occur; and altogether I am very doubtful of its always acting so well as it did in the case of my patient. (Dr. Matthew Hay, p. 175.)

Nitrite of Ethyl.—The fact that nitrite of ethyl is capable of influencing the circulatory organs in the same manner as nitrite of amyl was first pointed out by Dr. Richardson in 1867, though Hermestadt had previously noticed that it affected the head and the circulation. Richardson found that in man it caused a sense of fulness in the head, rapid action of the heart, and suffusion of the skin, just as nitrite of amyl does, and that, like this latter drug, it causes the blood to become of a chocolate colour. Dr. Hay, in his recent papers in the Practitioner, confirms Dr. Richardson's statements. He proves that nitrite of ethyl further resembles nitrite of amyl and the other nitrites, in its power of averting anginal attacks, but he states that twenty minims of nitrite of ethyl produced on himself no perceptible effect, and that given to a patient with angina it also failed to produce any effect on the ailment till sixty or seventy minims had been taken: then it acted like nitrite of soda. (Dr. D. J. Leech, Practitioner, October, p. 242.)

CARDIAC MURMURS.—The following *résumé* concerning the disappearance of cardiac murmurs may be useful:—Although murmurs are among the most constant of the physical signs of heart disease, still their presence does not necessarily indicate the existence of incurable lesions, nor their absence that such lesions are not present. In forming a correct diagnosis and prognosis of any case, therefore, too much reliance must not be placed on the presence or absence of murmurs, as is too frequently the case, but other signs and symptoms must receive careful examination and consideration, for often on them alone is it possible to found a correct diagnosis. The *presystolic murmur* of mitral stenosis, the most typical of all murmurs, occasionally disappears, the lesion still remaining. *Mitral regurgitant murmurs*, when due to simple relaxation of the heart's muscle, and dilatation of its cavities and orifices, as in chlorosis and general febrile conditions, in most cases completely disappear under appropriate treatment. *Tricuspid regurgitation* is occasionally a temporary condition, due to bronchitis, &c., and when the cause is removed, this condition is recovered from, as is indicated by the disappearance of the murmurs. *Aortic systolic murmurs*, due to a permanent lesion at the aortic orifice, may undergo changes in their intensity, but never completely disappear. *Aortic diastolic murmurs* in certain extremely rare cases have been known to disappear. In these cases a systolic aortic bruit is always present, which remains persistent, and thus indicates the existence of the lesion. *Pulmonary systolic murmurs* are persistent when due to an organic lesion; but, if non-organic, may disappear temporarily or permanently. (Dr. E. H. Greves, p. 178.)

DELIGATION OF LARGE ARTERIES BY APPLICATION OF TWO LIGATURES, AND DIVISION OF THE VESSEL BETWEEN THEM.—Mr. Savory recently called attention to the danger with which, he thinks, is fraught the modern practice of separating the sheath of the artery by means of the director. (*Retrospect*, vol. 87, p. 16.) He says: "It has happened in more than a single instance to me to see the artery injured, both in the dead and the living, by operating in this way;" and, to avoid the danger, he strongly advocates the opening of the sheath with the knife. It must have happened to all to have seen varying amounts of sheath separated from the artery by different operators, and even by the same operator at different times; and I believe that, whether the director or the knife be used, a certain amount of risk must always be run of too free an exposure of the vessel. There must always be a portion of the artery, however small, on each side of the ligature, the blood-supply of which has been more or less interfered with; and, as the vessels of the sheath run principally in a direction from the proximal towards the distal end of the artery, it is but reasonable to suppose that the blood-supply on the distal side of the ligature will be the more affected, a circumstance which may have more to do than is generally supposed with the fact that, in secondary bleeding, the blood more often comes from the lower than from the upper end of the vessel. A slightly extra separation of the sheath must render the exposed portion of the artery liable to slough, or to die and be cast off. Such would appear to have occurred in the very interesting case reported by Mr. Bartleet at the last meeting of the British Medical Association. "On the seventh day after ligature, alarming hemorrhage ensued. On opening the wound, the artery-forceps brought up, with the slightest pull possible, what proved to be the catgut ligature. On examining this, the catgut was found to be not at all softened, but firmly knotted, slightly surrounding a small piece of artery which had come away with it. It did not appear to have ulcerated through the artery at all. The artery had separated about one-tenth of an inch above, and the same distance below, the ligature." Here the ligature had evidently no share in causing the secondary hemorrhage, as it came away intact; and it seems difficult to explain how the death of the portion of the artery which came away with it was caused, other than by loss of vitality in consequence of the disturbance of the blood-supply that it receives from its sheath. It is not stated in the report how the sheath was opened. It would be instructive to know, in cases in which secondary hemorrhage has occurred, in what way the vessel was freed from its sheath. If two ligatures be applied, and the vessel divided between them, all risk of too free a separation of the sheath is absolutely avoided as one ligature can be applied at the spot where the sheath is separated above, and the other where the sheath is separated below. After the vessel is divided, each cut end retracts, drawing the respective ligatures well into the sheath, thus leaving the blood-supply of no portion of the vessel on the proximal and distal side of the upper and lower ligatures respectively in any way interfered with. The artery is thus placed under very nearly the same conditions as one which has been ligatured in a stump, and exactly under the conditions as one the ends of which have been secured in a wound, and from such secondary hemorrhage is very rare. Indeed, I am not aware that, after the two ends of a divided vessel have thus been tied in a wound, hemorrhage, except from the slipping of a ligature, has ever occurred. The normal longitudinal tension of the vessels constitutes another, and I believe not inconsiderable, source of danger in ligaturing an artery in its continuity. A transverse wound of an artery, as first pointed out by Mr. Savory, in consequence of this elastic tension, assumes a diamond shape. Should any part of the ligature cut through the vessel before it has become permanently occluded, this tension, by causing such a cut in the vessel to gape, thereby disturbing the connection of any internal clot that may have formed, or adhesions of the coats that may have taken place, must tend to the production of secondary bleeding. In a case of secondary hemorrhage under the late Mr. Callender, on cutting down at the seat of ligature to secure the bleeding points, the hemorrhage was clearly seen to be due to such a cause. The vessel, which had been secured by a catgut ligature, had given way opposite the knot (which itself was intact), and a gaping wound one-tenth of an inch wide existed in the walls of the vessel. By applying two ligatures, and dividing the vessel between them, all tension is taken off, and both ends are placed in a state of rest—the most favourable condition for healing. (Mr. W. J. Walsham, Brit. Medical Journal, April 7, p. 660.)



LIGATURE TIGHTENER.—The instrument represented in the accompanying woodcut is devised, as its name indicates, for the purpose of tightening and securing a ligature applied to a structure so situated that the fingers cannot be efficiently used to tighten it; or of being applied to a morbid growth, the size of which may require greater constricting power than can be produced with the fingers alone. The ligature recommended is one composed of five or six strands of the best white thread, the strands being from fifteen to eighteen inches in length. The ligature is passed twice round the part to be tied, as shown in the woodcut. The ends of the ligature are fastened to the stem of the instrument, which is then worked as an ordinary wire-rope écraseur. If the ligature is properly applied to the part, no second tying of it is required. Ordinary single ligatures may be tightened by the instrument. Wire may be used to constrict a morbid growth, either temporarily or permanently, before removal. The wire is applied singly around the growth, and is crossed before fixing it to the instrument. When sufficient constricting power has been produced, the wire is twisted by making two or three turns of the whole instrument. The instrument has proved very useful in a sub-peritoneal pedunculated growth of the uterus, and in two cases of uterine epithelioma. In a highly vascular growth of the rectum, in a female, it was found highly efficient in controlling the severe hemorrhage which ensued after the growth had been transfixed and tied in two portions. The instrument was made for me by Messrs. Mappin and Co., surgical instrument manufacturers, New street, Birmingham. (Prof. J. Clay, Birmingham, Lancet, June 9, p. 997.)

NÆVUS.—*Superficial Venous Nœvi.*—The treatment of superficial venous nævi found by me to be painless, safe, scarless, and certain, but little known, or to speak more correctly, almost forgotten, was worked out by the late Dr. Marshall Hall. His object was to excite just so much increased action in the growth as to cause deposition of lymph and occlusion of its vessels. He, for this purpose, introduced a cataract-needle at about a line from the circumference of the nævus, and passed it from the point of its entrance to the opposite extreme edge of the growth, keeping it in all its course as near as possible to the surface. The needle was then withdrawn almost to its point of entrance, and pushed again through the nævus at about the sixteenth of an inch from the line of the first puncture, and so on until the lines of puncture took a fan-like shape. It is desirable to keep the needle as close as possible to the surface, though should it penetrate the thin covering of the growth, a piece of adhesive plaister arrests the bleeding immediately. There is no need of breaking up the structure of the nævus, as has been recommended. The way in which nature perfects the cure is very beautiful. A small white spot soon makes its appearance in the centre of the growth; this gradually spreads, and there is left in a few months a spot perfectly smooth, and whiter than the surrounding skin. A few months should be allowed to pass before following Dr.

Marshall Hall's advice to puncture again, as I have never found it necessary. One operation has invariably succeeded in the superficial venous nævus. (Mr. W. M. Coates, p. 272.)

Arterial Nævi.—The bright scarlet or arterial nævus, whether it appears as a small bright spot, or as a patch measuring one or two inches in diameter, or, again, as one or two minute arterial branches, requires a more pronounced treatment, based, however, on the same principle—stimulation, not destruction of tissue. My first case of minute arterial nævus occurred in a young bride. It was on the left side of her nose. It was, she said, increasing. Nitric acid would have left a pit. I made a puncture into the bright spot with a bleeding-lancet, and then passed into the small incision a point of nitrate of silver, holding it there for a few seconds; this we all know is a stimulant, not a caustic. This cured the nævus, leaving no scar. The needle would have been useless in such a case. When there are several minute arteries radiating just beneath the cuticle, nothing but destruction by nitric acid, or tying the part, both of which leave scars, or the following little operation—which, as the next case will illustrate, was discovered by a lucky accident—has succeeded in my hands. A young lady, aged 15, was anxious to be present at her sister's wedding, which was to take place in three weeks. She had observed a red spot on her left cheek. On examination, there were at this part several minute vessels, which divided into several branches. I had in other cases tried to deal with them by cutting through subcutaneously each trunk and branch by a cataract-needle having sharp edges, but failed. Nitric acid was undesirable, as was tying, from the attendant pain, and inevitable cicatrix. I determined to try the needle again, as, at the worst, it could do no harm. On taking it out from its case, I was momentarily annoyed to find its point broken off; but, after a moment's reflection, I saw how this might be turned to good account. I determined to proceed. I entered the broken needle at a line from the nearest branch, but with the flat of the needle at right angles to the skin, and pushing it steadily forward, tore through each vessel and branch in several directions. The next morning, a bluish spot had taken the place of the red one, produced evidently by an ecchymosis. This was absorbed in a week, and the case was cured. The cure was permanent, as five years have elapsed, and no sign of the deformity exists. (Mr. W. M. Coates, p. 273.)

Thick Nævi. — When a nævus, venous or arterial, exceeds a thickness of one-sixteenth part of an inch, the needle-operation is not applicable. Having failed with it in one or two cases, I looked out for a more effective treatment for what I shall call thick nævus. During my investigation of the treatment of bronchocele, cold abscess, and hypertrophied glands, I was struck by the power of hardening, contraction, and subsequent absorption possessed by hypodermic injections of undiluted tincture of iodine, and made up my mind to try it in the first case of thick nævus that presented itself. The following case gave me the opportunity. A. E., aged one year, became an in-patient at the Salisbury Infirmary in the year 1861. This little girl had a venous nævus, of the size of a large walnut, situated on the left eyebrow, from which it hung down, completely obstructing vision in the corresponding eye. When admitted, there was a thread seton which had been passed through the centre of the tumour. The patient's mother stated that there had been no improvement. I was induced to try a treatment recommended at that time by some surgeons. It consisted in making several punctures by a small hot iron. These produced little pits in the skin, but no improvement followed. I then threw into the midst of the nævus, hypodermically, half a drachm of undiluted tincture of iodine. Hardening was the immediate result. This was repeated every month. The nævus soon began to lose its colour and to slowly shrink. In twelve months it no longer obstructed vision. I then lost sight of the patient. As she lived only seven miles from Salisbury, I visited her in 1869, and found that the nævus had entirely disappeared; but the seton and hot iron had left pits which will, of course, last during her life. Since 1861 I have treated all nævi projecting more than a sixteenth part of an inch from the surface in this manner. The little operation is very simple. Wood's syringe, with a very fine needle, is the only instrument required. Sufficient tincture of iodine having been drawn into the syringe to fill the nævus, the needle is introduced through the skin at about a line from the circumference of the nævus, and passed to its centre. The piston is propelled slowly home, so as to force the tincture into every part of the growth. This is facilitated by moving the point of the needle into every part of the nævus. On withdrawing the instrument, pressure is made on the small puncture for a few seconds, and the proceeding is complete. (Mr. W. M. Coates, p. 275.)

Nœvus Maternus.—I have met with a large number of examples of this disease, and I have never failed to cure the cutaneous variety by the introduction of heated needles into the base of the tumour. If this be small, one operation is generally sufficient; in larger tumours several operations may be required before the cure is complete. As to the needles used, it has always been my practice to employ a shoemaker's awl, which is slightly curved at the point and flattened. Such an instrument is much larger than the needles that are generally used for this purpose. My assistant holding the child, I place the head (face upwards) between my knees, as in this way I have perfect control of its head. Another of my assistants holds the alcohol lamp at my right side, in which I heat the end of the awl to redness, and then plunge it into the tumour. The manner of introducing the awl is of importance. It should be thrust into the base of the tumour and towards the centre—not into the top. Holding it there a moment, I withdraw it, and re-beat it preparatory to a second introduction. There is scarcely any bleeding. This procedure is repeated until the entire circuit of the base of the tumour is completed. Observe that I plunge the awl in at the juncture of the skin with the tumour, and push it downwards and inwards. If punctures are made only at the top of the tumour very little is gained by the operation. You should strive to destroy the vessel at its base. Having completed the circuit, I now make a few punctures in the most prominent part, over the surface of the nævus. The swelling has now become very much reduced in size. One of the punctures which I have just now made into the surface of the tumour is followed by a free flow of blood almost equal to an arterial jet. A second introduction of the needle fails to arrest the hemorrhage. Under such circumstances you will find that the best method of arresting the bleeding will be to make firm pressure over the bleeding point with a sponge for a few minutes. This I have never known to fail in stopping it. The needle is introduced at a black heat—that is to say, although heated to redness in the flame of the lamp, before you reach the tumour the redness has disappeared. Although the child cried during the operation, it did not seem to be suffering very much, and now that I have completed the operation the patient has ceased crying. No special dressing is required; I generally advise, however, that the part be covered with a light compress wet with cold water during the first night. Two weeks later the patient was again brought to the clinic, when it was observed that a decided change for the better had taken place, the tumour having shrunk to less than a third of its former size. It was much flatter, and the redness over its surface had almost entirely disappeared, except at one or two points. Two or three additional punctures with the hot awl were made, it being introduced as before into the base of the vascular prominences rather than into their summits. It was predicted that this second operation would be all that was necessary to effect a cure, and that only a very slight cicatrix would remain. There are two other methods of heating needles, namely, by means of galvano-cautery and Paquelin's thermo-cautery. The points coming with these apparatuses, however, are larger than those made by the awl, and the apparatuses themselves are clumsier and much more expensive than the simple alcohol lamp and shoemaker's awl. (Professor Little, New York; Medical Times and Gazette, June 9, p. 651.)

Large Nævi.—When a nævus is large and growing, some prompt and effectual treatment is demanded—one on which thorough reliance may be placed. It is a great point if the surgeon can almost promise that a single operation—and that not of a cutting nature—will be all that will be necessary. In my experience, all the demands are supplied, and most of the objections avoided, by the treatment of large nævi by that useful instrument, the thermo-cautery of Paquelin. I show you the two blades which I employ; the larger the nævus, the larger the heated point. This small needle-blade is very efficient in dealing with small nævi, or nævoid stainings. The vapour of benzine, pumped through the hollow stem with the india-rubber hand-ball, is ignited at a low temperature, and keeps the point of the blade at any desirable heat throughout the whole operation. Having been heated to a dull redness, the blade is thrust through the skin in as many places as may be considered necessary, and the point directed to all the regions of the vascular mass: central, deep, and peripheral; each district must be searched out and invaded. The skin-punctures should be made well within the limits of the tumour, as the effects of the cautery necessarily extend beyond the limit of the tissues actually traversed. By the slow and cautious withdrawal of the blade, the small eschars are permitted to remain, sealing the wounded vessels, and thus not a drop of blood need be lost. A few black sinuses, surrounded by a ring of skin which has been reddened by the scorching, remain after the operation, and the tumour is found smaller and firm from coagulation having taken place throughout the entire mass. Oiled lint may be used as a dressing. For the next few days the part looks angry and swollen, and is evidently painful. Then a slight amount of sloughing takes place, and, in a few days more, some small clean ulcers mark the dwindling mass. The ulcers heal, and cicatricial contraction, taking place throughout the entire mass, determines the process of shrivelling. The integumeut does not perish, except where wounded; but it loses its old purple staining, from the obliteration of the vessels which formerly brought to it the unsightly injection. It is unnecessary here to particularise the various situations in which one has thus destroyed nævi; but I may perhaps remark that the most unequivocal successes have been obtained with those tumours which occupied the entire substance of the lip (of which there were several examples); in these, by attacking the tissues deeply from the dental surfaces, one was enabled to reach their dermal limit without implicating the skin in the least. And, whereas the lip had previously protruded greatly, the subsequent cicatrisation of the mucous membrane brought it into the natural position. A flat bleeding nævus, which occupied almost the entire extent of the mucous lining of the cheek of a grown girl, was treated in much the same manner, and was obliterated in a single operation; indeed, I am at a loss to know by what other means such a nævus could have been effectually dealt with. (Mr. Edmund Owen, Brit. Med. Journal, Aug. 18, p. 320.)

Popliteal Aneurism.—*Immediate Ligature of the Femoral Artery.*—The safest plan of treatment for all large, all rapidly growing, and all thin-walled popliteal aneurisms is to tie the femoral artery at once, that is, after a few days confinement to bed; and that the safest way of tying it is that which interferes the least with the natural connections of the artery. I believe, further that the safest material for the ligature is either the ox-aorta ligature of Mr. Barwell or the kangaroo-tendon ligature which was introduced at St. George's Hospital by our then assistant surgeon Mr. Stirling, and which was brought under the notice of the Royal Medical and Chirurg. Society by Mr. T. Smith and Mr. Girdlestone of Melbourne. (*Retrospect*, vol. 87, p. 269.) Much is said in the present day about "progress" in everything, and not least in surgery; everything is constantly changing, and it seems almost to need an apology if a surgeon treats his patient as Sir A. Cooper, or even as Syme, would have treated him. There is no wonder, then, that the treatment of aneurism by the ligature has become much restricted. We no longer look on pressure in the treatment of popliteal aneurism with the disfavour with which Syme regarded it. In fact, in one or other of its many forms, it is undisputably the routine treatment; yet, like all other "routine" treatments, it is liable to do mischief if it be not used with discrimination; and this seems to me specially the case with the two forms of pressure which are the most uncertain in their effects, and the least easy to regulate—I mean genuflexion and the use of Esmarch's bandage. But even the less dangerous methods of pressure, by the finger or by instruments, not uncommonly do considerable harm, even when they are borne perfectly well by the patient. I have never ventured on the application of Esmarch's bandage to a large, rapidly growing, thin-walled tumour; nor do I think that a prudent surgeon would advise the treatment; while, as I have been successful in the treatment of such cases of small aneurism as I have had under my care, by methods with which I am more familiar, and in which I have more confidence, I have no personal experience of the method, nor have I heard that any of my colleagues have used it. I published in the Clinical Transactions, vol. ix, the account of a case in which I should certainly have used Esmarch's bandage had I then been acquainted with the treatment. And even with those methods of pressure to which I allude, I have, I think, seen more harm than good from a too long persistence in their use. If they do not succeed quickly, I believe it is better, on the whole, to give them up, and resort to ligature; though I am aware that success has often been obtained by the protracted use of pressure, still I have seen many cases in which, after a good deal of suffering, the patient has been left in a worse general condition to bear the ligature, and with no improvement in the local conditions, and even one or two in which the aneurism has ruptured, and a case which might have been easily dealt with by primary ligature has become complicated and very dangerous. Hence, while fully recognising the value of all the forms of pressure, of which, indeed, my own experience has been sufficiently favourable, I do not think it wise to insist on their employment unless some considerable improvement has been obtained in a week. And in persons who are irritable from alcohol, or are unusually susceptible of pain, the use of pressure requires still more consideration. (Mr. T. Holmes, Brit. Med. Journal, June 9, p. 1106.)

Carbolised Catgut Ligature.—In a case of popliteal aneurism showing the value of this ligature, the artery was tied in Scarpa's triangle with a carbolised catgut ligature prepared with chromic acid, in the manner recommended by Mr. Lister. Antiseptic precautions were observed, but no spray used. The ligature was cut short, a small drainage-tube inserted in the wound, and the incision closed with a continuous suture of carbolised silk. The dressing consisted of a pad of salicylated wool enclosed in eucalyptus gauze. 22d: The wound had healed excepting where the drainage-tube projected. The tube and stitches were removed, and a strip of plaster was placed across the wound. There was slight pulsation to be felt in the tumour. 25th: No pulsation felt in the aneurism. No fever or constitutional disturbance ensued upon the operation; the aneurism consolidated, and, with the exception of a little cough, he was quite comfortable on Aug. 9th. He was dressed and lay outside his bed. The aneurism continued to diminish, and his condition seemed satisfactory until Aug. 19th, when in the night he became suddenly delirious; the delirium was succeeded by drowsiness, and subsequently by coma, in which condition he died on the 22nd, a month and two days after the operation. On dissection, the catgut ligature appeared unchanged; it surrounded the artery, being embedded between the outer coat of the vessel and a thin layer of fibrillated lymph. The knot was firm. The two inner coats of the vessel were divided at the seat of ligature; they were curled inwards, and were united where in apposition. The external coat of the artery where surrounded by the ligature was intact. The examination showed, therefore, that the chromicised catgut ligature, thirty-three days after its application, remained firmly around the artery in a perfectly harmless condition. There was no sign of irritation in the surrounding tissues, which were soundly healed. (Mr. Warrington Haward, p. 270.)

TENACULUM (IMPROVISED).—The absence of a tenaculum may be well replaced by a small fish-hook secured to a pen-holder. (Polyclinic, Aug. 15.)

VARICOSE VEINS.—*Subcutaneous Ligature of.*—The plan I venture to bring forward is that of subcutaneous ligature of the vein; and, I trust, it will be found safe, efficacious, and very simple and easy to apply. It is safe; for the ligature is applied with the slightest possible disturbance of the surrounding parts. It is efficacious, as it completely stops all circulation in the vein for ever afterwards; and I think you will admit that the operation is extremely simple and easy to be performed. A very small incision is made on each side of the vein, of the width of a tenotomy-knife. The ligature is then passed under the vein with a curved needle, which is made to enter at one incision, and is brought out at the other and withdrawn, leaving the ligature *under* the vein. The straight instrument, which is just sharp enough to go through fat and cellular tissue, but not sharp enough to endanger a vessel, is passed from one incision to the other between the skin and the vein; it is then threaded with the ligature, and withdrawn. The ligature now encircles the vein, with both its ends through the first incision. It is tied as tightly as possible, and the ends cut off closely. If a spot of blood remain, it is to be sponged away, the skin dried, and the incisions pencilled over with collodion, and the operation is complete. Of course I do not pretend to say there is anything new in tying a varicose vein subcutaneously, though I wish to suggest its more general adoption, as being thoroughly effectual; and I believe that by using the little instrument now shown, the operation may be performed in the easiest manner possible, even by anyone not much accustomed to operating. There is nothing unsightly for the patient to see; and the part may be easily and comfortably dressed. (Mr. W. H. Folker, Brit. Med. Journal, Aug. 18, p. 320.)

AFFECTIONS OF THE RESPIRATORY SYSTEM.

ASTHMA.—*Small Doses of Arsenic.*—I know of no drug so generally useful in the treatment of asthma as arsenic, and could give, from fifteen years' experience, a great many cases of spasmodic asthma that have seemed to me to get quite well under the influence of small doses of arsenic. I have never exceeded the dose of three minims of either Fowler's solution or of liquor sodæ arsenitis three times in the day, and have never seen any symptoms of arsenical poisoning, except in one case where a very susceptible gentleman finds that one minim of the liquor sodæ arsenitis taken twice daily for a week brings on inflammation of the eyes and pain in the stomach. Twice within this present year I have had brought to my notice examples of the sudden development of very unpleasant symptoms in the instances of persons who were taking five-minim doses of liquor arsenicalis three times daily. (Dr. Thorowgood, Med. Times. June 30, p. 725.)

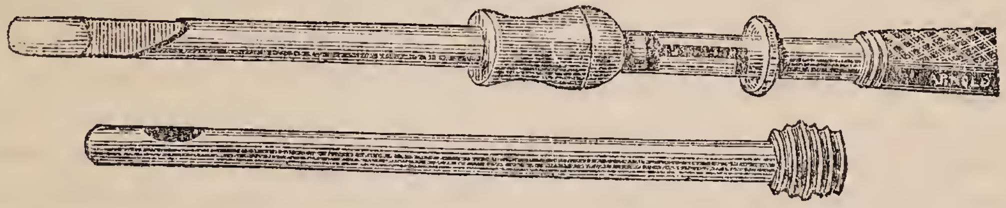
Uræmic Asthma.—Nitrite of Amyl and Nitro-glycerine.—The following brief notes illustrate the value of nitrite of amyl and nitro-glycerine in one of the sudden and distressing, though perhaps rare, phases of chronic Bright's disease—viz., uræmic asthma. Nitrite of amyl, acting, probably, through the vaso-motor nerves, relaxes the arterioles, and thus reduces blood-pressure. As it is very volatile, on the score of economy and convenience, I always carry some of Martindale's capsules in my bag, and these are very handy for immediate use. Nitro-glycerine is said to have much the same action as nitrite of amyl, and, according to Dr. Mahomed, its great superiority over amyl lies in its gradual and more lasting effect, and the more convenient manner of prescribing it, and it can be taken regularly two or three times a day, or oftener, one minim of a one per cent. alcoholic solution being the usual commencing dose. It is also made up in chocolate tablets, each containing one-hundredth part of a minim; but its action when given in this form is not so rapid as that of the alcoholic solution. M. P., aged 55, retired from business May 4th, 1882. He had been ailing for two weeks, but had been about. He had noticed swelling of his legs towards night for two months, and his face had swollen occasionally for the last month. He had always been careless of his health, and if he got wet, an event which happened not unfrequently, he would never change his clothes. He was taken suddenly ill in the evening whilst out walking, about a mile from home, and had to be taken home in a cab. On visiting him at 10 a.m., I found him sitting up in bed, gasping for breath, countenance distressed, and of a sickly pallid hue. Pulse feeble; temperature 98°; tongue pale and sodden; expectoration frothy, with some little blood intermixed; moist *râles* over whole chest, back and front; urine abundant, clear, containing one fourth of albumen. At 2 p.m. I found his condition and posture unchanged; he could only speak a few words before he had to stop for breath. He inhaled three minims of nitrite of amyl (a capsule broken in a handkerchief). Within a few minutes his breath was easier, and he was able to recline in bed, for the first time since the attack came on, before I left the house. I then put him on nitro-glycerine, one-hundredth of a minim thrice a day. May 5th. He was lying easily in bed, breathing quietly, and expressing himself as feeling quite well; he said he was only waiting till I came before he got up. I cautioned him unavailingly that his life hung by a thread, and that he could only hope to continue it by the strictest obedience. On the 6th he still remained in the same improved condition. The next day he refused to take any more medicine, but promised to stay in the house, a promise which he did not keep. On the 16th he had another attack, and died quietly within thirty-six hours, the urine being loaded with albumen. (Mr. A. Sheen, Cardiff, Brit. Med. Journal, April 28, p. 811.)

Of the four groups, into which cases of uræmic dyspnœa may be arranged, in one only is nitrite of amyl of much service. In that class, however, its beneficial action is most striking, and it stands almost alone in the rapidity with which it gives relief to the breathing. It must, however, be used with both caution and intelligence; otherwise, instead of giving an opportunity for useful treatment, it may only mask the progress of the disease, and while easing painful symptoms, merely lead the patient on to euthanasia. (Dr. Solomon C. Smith, p. 187.)

BRONCHITIS (SUFFOCATIVE).—*Emetics.*—In suffocative bronchitis, the effect of emetics is sometimes magical, and by their administration in such cases not only is immense relief given, but I verily believe—I am certain—that lives are saved. You are called to a patient who has been ill a few days, with increasing dyspnœa; she is sitting up in bed (I draw from nature), for to lie down is impossible; she is restless, and tossing about; the lips, and indeed the whole face, blue; the eyes watery and staring; the pulse quick and small; the cough constant; the expectoration semi-transparent and tenacious; over every square inch of the chest, front and back, from apex to base, you find abundance of rhonchi; moist, sonorous and sibilant ones in the upper part of the lungs, and muco-crepitant or mucous *râles* towards the bases. Ammonia and stimulants, right and good in their way perhaps, in such a case are too slow in their action; the patient is, in fact, more or less slowly, more or less rapidly suffocating. An emetic of twenty-two grains of ipecacuanha in an ounce of water is given; in ten or fifteen minutes, the patient vomits and brings up a huge quantity of that tenacious mucus, and the whole aspect of the case is altered; the distressed countenance is relieved; the breathing is at once quieter; and the patient is able for the first time for the past twenty-four hours to lie moderately low in bed, and to get some sweet refreshing sleep. The patient is, in fact, rescued from the extremest peril, and in this case, and in many similar ones too, I believe, from otherwise most certain death. Of course, in such cases the emetic is not given for its effect on the stomach, but for its collateral effect in mechanically clearing out the enormous amount of secretion which accumulates in the bronchial tubes, and which the patient is otherwise quite incapable of getting quit of; and thus the half-choking, almost asphyxiated, condition is changed for one of comparative comfort, and time is gained for the action of other appropriate remedies. No doubt the secretion may, and often will, accumulate again; and I have not hesitated again in bad cases to repeat the same good remedy; but it is a fact, and a very positive one too, that, quite contrary to what those who have had no experience in the plan suppose, the system rallies instead of being more depressed under the action of the remedy; and, in the language of one who had had thirty years' experience in the beneficial effects of ipecacuanha in emetic doses, it is, so administered, "a powerful restorative in some cases of exhaustion and sinking." (Dr. C. J. Hare, p. 191.)

DYSPNŒA IN THE EMPHYSEMATOUS. — *Use of "The Elastic Respirator."*—Prof. Bazile Féris, considering the dyspnœa associated with emphysema the most painful and troublesome symptom of the disease, has devised an apparatus which he terms the "elastic respirator" to render breathing deeper and easier. The chief cause of the dyspnœa is loss of elasticity in the alveolar walls, the chest being fixed in the inspiratory position; any therapeutic resource therefore which will facilitate expiration, or restore to the lung its lost elasticity, will abolish the dyspnœa. The apparatus designed by the author is extremely simple and light. It resembles exactly a double hernia truss: from a pad situated between the shoulders, the two limbs of the truss pass round under the arm pits to the terminal pads in front, which are rather larger and thinner than those of a hernia truss. Light straps passing over the shoulders keep the pads in position. The parts at which these pads should be made to exercise pressure are the least resistant parts of the thoracic wall, usually the upper and anterior part of the chest, over the cartilages and the ends of the ribs. The first effect of the pressure so applied is to drive out the air from the chest, that is, expiration is effected; inspiration then follows without any effort, as the inspiratory muscles are not enfeebled, but have rather increased in volume; then again artificial expiration, and so on. The increased movement by the chest wall so obtained was clearly shown in some tracings taken by M. Constantine Paul. The actual practical results obtained by M. Féris, in the treatment of thirteen cases of emphysema, were very striking. The relief to the dyspnœa was as a rule instantaneous; patients could walk, run up and down stairs, sometimes even run with little fatigue. One patient was so much improved that he left hospital without his respirator; he had not gone 300 yards however till he came to a stand-still, and had to return to the wards leaning on the arm of an attendant: then, having put on his respirator again, he went out in comfort, and did not return for seven hours. Four very striking and successful cases are recorded in detail. The author's account of the benefits derived from using his apparatus is still further confirmed by experiments with the spirometer: it was found that breathing easily with the respirator in position, the volume of air respired was nearly double that respired without the apparatus. Another point worthy of notice is that not only does this respirator deepen and facilitate respiration, but it diminishes the rapidity of the respiratory movements. In the very aged, in whom the chest is rigid, this apparatus is not of so much use, though even here it favours expiration by lowering the ribs. When the emphysema is complicated by intense bronchitis, the dyspnœa does not disappear completely. (Prof. Féris, Glasgow Med. Journal, Sept., p. 229.)

EMPYEMA AND DEEP-SEATED ABSCESSES.—*Antiseptic Trocar and Knife.*—Dr. Ward Cousins finds that in many of the minor operations of surgery the ready conversion of the exploring instrument into a bistoury will be found serviceable. At the point selected, the antiseptic trocar (exhibited by him at the Ryde meeting of the British Medical Association, 1881) is first introduced, and a portion of the fluid withdrawn for examination. Incision can now be safely performed by removing the India-rubber cover, and withdrawing the inner tube of the instrument; then introducing the knife, which is made to accurately fit the trocar, and to project a cutting edge of one inch and a quarter. A mark in the handle indicates the direction of the blade. The trocar is thus converted into a sheath for a probe-pointed bistoury, and is especially adapted for the treatment of empyema and other deep-seated abscesses. (Dr. Cousins, Med. Record, August, p. 350.)



HOOPING-COUGH.—*Eucalyptus.*—Dr. Whitthauer reports four cases of pertussis, treated with tincture of eucalyptus globulus, which recovered in a little over three weeks. The dose for children from two to four years of age was 5 to 8 drops. One of the patients, eighteen months old, suffered from well-marked rickets. After taking the eucalyptus for four weeks, not only was the whooping-cough cured, but the enlarged epiphyses were reduced, and the child, who had never before attempted to stand on its feet, learned to walk. (Edin. Med. Journal, July, p. 63.)

INHALATION AND DISINFECTION IN AFFECTIONS OF THE THROAT AND LUNGS.—In using the oral and oro-nasal inhalers and the air and steam sprays as at present practised, not more than traces of the antiseptics used made their way into and were to be detected in the water or spirit contained in the receiver, or Woulfe's bottle, placed at the end of the trachea of a recently killed sheep. Recognising the inefficiency of the means now resorted to, for introducing into the lungs various antiseptic and other curative substances by means of inhalation, I was led to consider whether it were not possible to charge the air of a chamber with the required medicaments, and these in the proper amounts. I have arrived at the conclusion that such a charging of the air of chambers is really practicable, an object which has not, so far as I am aware, been hitherto accomplished. For effecting this purpose I rely on two principles: one is the greatly increased volatilisation of certain chemical substances, which at the ordinary temperature of the air are but little volatile, obtained by spreading the substances over a very considerable surface, and exposing them either in the air or on water. To show the effect of this principle, I may mention that 50 grammes, or 770 grains, of carbolic acid, exposed to the air on a rough and moistened fabric, having a superficies of eight square feet, had disappeared, and were entirely lost at the end of thirty hours. Now, had the same quantity of the acid been exposed to the air in any vessel presenting only a small surface, the loss would have been but trifling, and in fact the weight of the crystalline acid would have become increased by the formation of the liquid hydrate. The second principle is the augmented evaporation obtained by increase of temperature in combination with extension of surface. Armed with these two principles, applied in a practical manner, we possess the means, as I have said, of charging chambers with medicaments to any required extent, and of forming true inhalation chambers. (Dr. Hassall gives the necessary data on which the methods to be used are based, see pages 182-4, and then describes his apparatus as under.)

Dr. Hassall's Chamber Inhaler and Disinfector, No. 1.—Armed with these principles and data I have devised the following forms of apparatus for charging the air of chambers for inhalation and disinfection. The first, which I have named the "chamber inhaler and disinfector, No. 1," consists of a long fabric woven so as to afford a very large extent of surface for evaporation. The length and breadth of this vary with the extent of the effect required to be produced. This is spread out in several tiers one above the other, by means of an arrangement consisting of a double series of rails which are attached to a box, and which lift out and in. These, when not in use, are packed away in the box, which also contains a tray to catch any drippings, and a tin box to receive the longcloth.

Chamber Inhaler and Disinfector, No. 2.—The second apparatus consists of an outer water-bath, to which a thermometer is attached, and an inner porcelain dish divided into four parts. The divisions of this are also filled with water, the temperature of which, by means of the outer bath, can be regulated and maintained to a nicety. With this apparatus, if desired, no less than four antiseptic or other substances may be used at the same time, either for inhalation or disinfection. It combines the advantages of moderate extent of surface with a temperature augmented, but regulated according to the nature and composition of the substances used—a very valuable combination. No hospital should be without one or more of these powerful disinfectors, especially the

No. 1 "chamber inhaler and disinfector." It will also be found of great service in private houses in cases of infectious disease. In using them one important fact must be borne in mind—namely, that it is not possible to charge the air of any ward or room with any medicinal substance or disinfectant while the doors and windows are open, as of course any amount of the substances which may be eliminated will be too rapidly dispersed to be of any service. It is not possible therefore to combine either effective inhalation or disinfection with free ventilation. (Dr. A. H. Hassall, p. 181.)

An Inhaling Tube.—This is a simple invention by Mr. Godfrey Harman, consisting of a wide-mouthed metal cone and tube passing from it at a right angle, intended to be adapted to any vessel that may be used for the purpose of inhalation of vapour. The cone is of sufficient size to cover the mouth and nostrils, and at the angle of junction with the tube a sponge can be placed to receive the medicament employed. The main merit of the apparatus is its adaptability to vessels of any shape or size. It is to be obtained of Messrs. Young and Postans, 35, Baker-street. (Lancet, June 9, p. 1003.)

NIGHT-SWEATING OF PHTHISIS.—*Agaric.*—How agaric acts in checking sweating is not very clear. Very little is known of its physiological action, but from some observations made on the frog's heart, I am inclined to think that it is antagonistic to muscarine. Agaric has of late been described in glowing terms as being superior to other remedies in the treatment of the sweating of phthisis. It is undoubtedly a good remedy, and there are times when it may be used with advantage, but I much doubt if it is equal to atropia, picrotoxine, pilocarpine, or Dover's powder. In small doses it is slow and uncertain in its action, whilst in large doses it is apt to purge violently. It has been suggested that the purgative action should be obviated by the addition of Dover's powder, but if we give Dover's powder we do not want the agaric, Dover's powder itself being one of our best remedies for the night-sweating of phthisis. Another difficulty is the mode of administration; patients do not like powders, and will not take large agaric pills when they can obtain prompt relief from one or two pilules of picrotoxine. Agaricine may prove a more valuable addition to our list of remedies, but that remains to be seen. Agaric has certainly not sprung very rapidly into favour, for it has taken over a hundred years to attain its present position. By Agaric is meant the Agaric of the larch or white agaric. It is a fungus, and is known botanically as *Agaricus laricis*, *Boletus laricis* and *Polyporus officinalis*. (Dr. W. Murrell, Practitioner, Nov., p. 321.)

PHTHISIS.—With respect to the purity of the air as a preventive or curative agent there are some curious facts which appeal to our judgments in rather a circuitous but yet cogent way, and which would seem to militate against many of our preconceived notions, and make us reverse much of what we have hitherto enforced in practice. Rokitansky and, more recently, Dr. Addison, have held the view that an excess of fibrine (hyperinosis) in the system predisposed to, if not favoured, the development of tubercle. In pregnant women the disease, if already present, is held in abeyance during the period of gestation owing to the fact that the arterial blood assumes, in a large measure, the venous character, from the excess of carbonic acid in the system in general, but in the circulating fluid in particular; and as venous blood contains a less proportion of fibrin (hypinosis) than does the arterial, the arrest, or prevention, of the development of phthisis in the gravid state is thus rationally and physiologically explained. The bright carnation or vermillion hue of the skin of consumptive patients furnishes additional proof of the excess of oxygen over carbonic acid in such cases, and would seem to indicate the most rational remedy for the prophylaxis or cure of the disease, which, under the circumstances, would necessarily be the very opposite of that recommended by so many writers and authorities on consumption. The solvent action of venous blood on fibrin prevents materially the deposition and development of tubercle, and goes far to strengthen the significance of the foregoing views, so that we are forced to infer that air contaminated to a certain extent by carbonic acid is not, after all, so deleterious to phthisical patients as we have been led to suppose. The well-known anæsthetic action of carbonic acid upon the terminal branches of the sensory nerves in general may not only allay "formative irritability," which, according to Virchow, plays such an important part in the genesis of tubercle and other morbid growths of tubercle, but also effectually calm the incessant, hacking cough which accompanies phthisis in all its stages, and thus become a potent preventive, as well as a curative agent, in the disease. (Dr. Bernard Kelly, Rotherhithe, Med. Press and Circular, July 11, p. 25.)

How are we to combat bacilli? Shall we apply medicaments directly to the pulmonary mucous membrane? or shall we depend on strengthening the constitutional powers to resist the attack, or shall we try both methods? The treatment of phthisis by vapours or inhalations is very old, and has never been very successful. During the last three years I have made trial of every form of respirator which seemed to offer any advantage, using in them a great variety of medicaments. I have specially noted their influence on cases where tuberculisation was commencing. Sometimes, though rarely, the cough has somewhat lessened, and the patients have felt soothed by their use; but I have never found them to have the slightest effect in diminishing the local disease, or in permanently reducing the cough. The contrast between the effects of these and the results of counter-irritation applied to the chest wall overlying the diseased lung is very striking. The cough, which weeks of inhalations have not relieved, is often at once reduced by the production of a good blister on the skin, and the expectoration, which was difficult, is quickly rendered easy by some forms of saline expectorant, especially if combined with a little antimony or ipecacuanha. Those practitioners who firmly believe in the antiseptic, or rather germicide, virtues of carbolic acid in phthisis, will do well to consider the statement of Mr. Watson Cheyne, reported in the Practitioner, April, 1883, page 285, Experiment xiv., No. 3, "One part of the fluid containing bacilli was mixed with one part of a 5 per cent. watery solution of carbolic acid; this stood fifteen minutes, and was then injected into the left eye of a rabbit." After forty-three days the animal was killed and found to have tubercular iritis of both eyes, and with a considerable number of minute tubercles in both lungs, one or two of which showed commencing caseation. The liver and spleen also contained tubercle. Microscopic examination showed abundant bacilli in all these organs. Here the influence of the carbolic acid was brought to bear on the bacilli in a far stronger and more intimate way than is practicable for application to the human body, except we are prepared to follow Dr. Fränkel's example and inject it and other antiseptics directly into the lungs through the chest wall, and the results of this mode of treatment as practised by him are not very encouraging. In Mr. Cheyne's experiment the carbolic acid seems to have exercised no influence whatever on the bacilli, which continued to prove their vitality by largely multiplying in the inoculated animal, and this shows the great importance of first studying the conditions of life of these low organisms outside of the human body, and then of testing the effects of various antiseptic drugs on them. In this way we may discover substances fatal to the bacillus, and then proceed to devise methods of applying them, so as to reach and attack the enemy in his strongholds of the human body. But this knowledge can only be attained by long and careful investigation and the work of many patient observers. Another mode of antiseptic treatment is by hot-water or steam inhalations of various kinds, some form of inhaler being used, and the different drugs kept at a temperature suitable to promote their vaporisation. In this way we, at any rate, do get the drug inhaled to a certain extent. The best form of this treatment seems to be jets of steam spray charged by means of capillary tubes with necessary medicaments, such as may be seen in use in the inhalation rooms of the new hospital at Brompton. The patients receive a good deal of the drug into their bronchial tubes and lungs in a short time, owing to the force of the steam current; but the objection lies in the damp and hot atmosphere which it causes and the inexpediency of subjecting the patient for any length of time to such strong measures. The third method is by diffusing through the air of a chamber medicated vapours. In this way consumptive cases can be kept under the influence of special drugs for long periods. In this method we only imitate some varieties of climate, such as those of the sea coast, of pine woods, and of sulphur springs, or in the neighbourhood of volcanoes. Two rooms are set apart for this purpose in the new hospital, and at the present time two of my wards, containing three beds each, are kept specially impregnated with the vapour of iodine and chlorine respectively, and suitable cases are selected for this mode of treatment. Observations are being made, and I purpose trying the effect of various drugs in this way. (Dr. C. Theodore Williams, Physician to the Brompton Consumption Hospital, Lancet, Aug. 25, p. 316.)

Internal Use of Glycerine.—M. Tisne gives an account of the results of the employment of glycerine by Drs. Jaccoud and Ferrand. The former prescribes it as a stimulant to the digestive organs in the non-febrile stage of phthisis, when for any reason cod-liver oil ceases to be tolerated. The following mixture is given daily in two or three doses: Glycerine, forty grammes, and rum or cognac ten grammes, with one drop of essence of mint. This aromatic alcoholised compound, of agreeable flavour, is well tolerated by the stomach, and even after long uninterrupted use it causes neither satiety or disgust. The addition of the rum or brandy has simply in view the modification of the insipid taste of the glycerine, and to assist its digestion. The amount of the glycerine may be raised to fifty or sixty grammes, but only in persons who do not exhibit any signs of abnormal excitability of the heart or nervous system; and restlessness, unusual loquacity, obstinate insomnia, or an increase of temperature announce that the proper dose has been exceeded. Dr. Ferrand makes daily use of glycerine in his wards at the Laennec, and it is found to be readily absorbed without producing any toxic effects. It diminishes constipation in almost all cases, and yet moderates diarrhœa when it is present; and under its use sleep becomes calmer. It has an evident effect on nutrition, its employment in most cases leading to an increase in weight after the first fortnight. In tuberculous cases it induces a considerable amendment in the functional manifestations of the disease, such as dyspnœa, cough, and sweating. The expectoration is the symptom which is least influenced. The local condition of the lung also remains stationary, and the physical signs undergo no change. The action of glycerine on the liver is exhibited by the increase of its size and by the more abundant flow of bile. With respect to its action on the kidneys, there are observed a more abundant diuresis, and an absolute and relative increase of the urea, chlorides, and phosphates eliminated by the urine. In affections of the genito-urinary organs, M. Tisne has found that under the use of glycerine the alkalescence of the urine seems to diminish, while purulence, when present, becomes considerably lessened. (Practitioner, Aug., p. 145.)

Influence of Sulphurous Acid in arresting.—Herr Kircher, a pupil of Liebig, has been during forty-four years director of an ultramarine factory, in which a special process of manufacture is employed which involves the formation of sulphurous acid by the burning of sulphur. He maintains that none of his workpeople have ever suffered from consumption, typhus, cholera, or any disorder which is produced by bacteria. He recommends the following treatment in the case of tuberculous patients. They should be brought into a room in which small quantities of sulphur (one to two drachms) are burnt every hour over a spirit lamp or on a stove. At first coughing of a more or less aggravated character takes place, and after eight or twelve days the bacteria gradually disappear and cease to irritate the lung-tissue. To complete the cure, the patients should be brought into rooms which contain some aromatic vapours. (Lancet, Jan. 20.)

TUBERCLE BACILLUS.—*Rapid way of Demonstrating without Nitric Acid.*—The following method, which I have used for some time with great success, will, I think, prove useful to those requiring the demonstration of the tubercle bacillus for diagnostic purposes in a rapid manner. The great advantage consists in doing away with the use of nitric acid. The stain is made as follows: Take of rosanilin hydrochloride two grammes, methyl blue one gramme; rub them up in a glass mortar. Then dissolve anilin oil 3 c. c. in rectified spirit 15 c. c.; add the spirit slowly to the stains until all is dissolved, then slowly add distilled water 15 c. c.; keep in a stoppered bottle. To use the stain: The sputum having been dried on the cover-glass in the usual manner, a few drops of the stain are poured into a test tube and warmed; as soon as steam rises pour into a watch-glass, and place the cover-glass on the stain. Allow it to remain for four or five minutes, then wash in methylated spirit until no more colour comes away; drain thoroughly and dry, either in the air or over a spirit-lamp. Mount in Canada balsam. The whole process, after the sputum is dried, need not take more than six or seven minutes. This process is also valuable for sections of tissue containing bacilli, as they can be doubly stained without the least trouble. I have not tried to do this against time, but have merely placed the sections in the stain and allowed them to remain for some hours, and then transferred them to methylated spirit, where they have been left as long as the colour came out. In this way beautiful specimens have been made, without the shrinking which always occurs in the nitric acid process. The stains may be procured from Messrs. R. and J. Beck, 68, Cornhill, E.C., either in crystals or in solution, ready for use. (Dr. Heneage Gibbes, Lancet, May 5, p. 771.)

TUBERCULOSIS.—*Relation of Bacilli to.*—Dr. H. F. Formad, Lecturer on Pathology in the University of Pennsylvania, after an elaborate series of researches on this subject, draws the following deductions. We give them as a serious American criticism on Koch's doctrines. (1) The predisposition to tuberculosis in some men and animals, the so-called scrofulous habit, lies in the anatomy of the connective tissue of the individual, the peculiarity being a narrowness of the lymph-spaces, and their partial obliteration by cellular elements. (2) Only beings with such anomalous structure of connective tissue can have primary tuberculosis, and such animals invariably do become tuberculous from any injury resulting in inflammation, or from repeated injuries. (3) Scrofulous beings can have no other than a tuberculous inflammation, although it may remain local and harmless. (4) Non-scrofulous men or animals may acquire the predisposition to tuberculosis through malnutrition and confinement, the latter bringing on the above-mentioned anatomical peculiarities in the connective tissue. (5) No external ætiological influences are necessary to cause tuberculous disease other than those which ordinarily produce inflammation, and even scrofulous beings will not become tuberculous unless local inflammation is set up. No inflammation, no tuberculosis. (6) Non-scrofulous animals, so far as can be established now, may acquire tuberculous disease through injuries of serous membranes, viz., peritoneum, pleura, &c., and even then without any special virus whatsoever. Clinical observations on the post-mortem table show similar conditions and prove the same in man. (Dr. Formad also claims that Koch's own experiments are really in favour of this proposition; but that he has overlooked the inference.) (7) The bacilli, which it is the merit of Koch to have first proved to infest tissues affected by tuberculous disease, are not necessary for its causation, even if a special organism exist and be really possessed of such property. The presence of bacilli (so far as our present knowledge goes) is secondary, and appears to *condition* the complete destruction of the tissue already diseased and infested by them, and this destruction is in direct proportion to the quantity of the organisms, which thus regulate the prognosis. The tuberculous tissue seems to serve merely as a nidus for the growth of the bacillus. (8) From the results of microscopic examination, from numerous observations upon the post-mortem table, and on clinical grounds, he has come to the conclusion that phthisis is not a specific infectious disease, but that the individuals suffering from tuberculous disease are specific themselves originally, and form a special species of mankind, the "scrofulous." (9) Scrofulosis is a condition which may arise from malnutrition and seclusion in any being, and thus may be produced artificially. It always depends upon the demonstrated anatomical changes in the connective tissue. (10) An analysis of Koch's experiments shows that he has not proved the parasitic nature of phthisis, or that there exists a special *Bacillus tuberculosis*; so that the infectiousness of tuberculous disease is still *sub judice*. (Practitioner, March, p. 218.)

AFFECTIONS OF THE DIGESTIVE SYSTEM.

Cathartic.—*Chloral Hydrate and Senna.*—B. Bonatti, in D. Med. Zeitung, recommends chloral hydrate in combination with senna as a rapid and safe drastic cathartic. He prescribes—℞ Infus. sennæ fl. ℥x.; chloral hydratis gr. xxiv to l; syrupi fl. ℥i. M. With this he obtained an action where coloin and jalap had failed. (Edin. Med. Journal, Sept., p. 273.)

Chronic Constipation.—*Small Doses of Tincture of Nux Vomica.*—Tincture of nux vomica, taken in doses of one to two minims, fasting, every morning, appears to me very useful in the cure of chronic constipation of the bowels, but I am pretty sure that five- or ten-minim doses three times daily act very much like quinine in checking the action of the liver and causing disturbance of system. (Dr. Thorowgood, Med. Times and Gazette, June 30, p. 725.)

Condensed Milk for Infants' Food.—Cow's milk is not sweet enough, and when compared with human milk very indigestible. It can only be made at all a possible food for babies by adding to it sugar and water and so making it more like condensed milk, but even then it is not so digestible as condensed milk; and it is not difficult to see the reason. Place some cow's milk with its added sugar and water in a wineglass, mix in another glass some condensed milk with water till it has, as far as one can judge by eye, about the same consistence and opacity; stand the two glasses side by side, and add to each, as the stomach does, a few drops of dilute nitro-hydrochloric acid and watch the result. They both curdle, but the curd formed in the wineglass of condensed milk is distinctly more friable, more mixed with the watery part than the curd in the cow's milk, and after standing for some time this is still more evident, for the curd in the fresh milk separates completely from the fluid into a firm clot, while in the condensed milk it remains more granular, more broken up, and more mixed with the fluid. And, except among the very poor, who cannot afford to buy cow's milk, it is this hard clot of cow's milk which is more than anything else the *fons et origo* of that only too well known incessant cry of dyspeptic hand-fed babies, and of all the vomiting and diarrhœa which so often carry them off—that hard indigestible clot, of which there is so little in human milk, and of which the analytical reports say with precise truth, as they might of a dinner of cheese, that it is so "nutritious," so full of "nitrogenous matter." And it is actually because of the small proportion of clot or casein which condensed milk contains that the second objection to it is made by the analysts. This clot or casein, which is so much the bane of hand-fed infants that the addition of oatmeal water or gruel to cow's milk, even before the child is able to digest any starchy food at all, often makes the milk more digestible, for the simple reason that the suspended particles in the oatmeal-water are interspersed through the coagulum which is formed when the milk enters the stomach, and so help to make it soft and friable, just as the water-weeds frozen into ice make the ice brittle and dangerous to skate on. Everything depends upon how condensed milk is given. It ought to be diluted with ten or twelve times its bulk of water, or with more than that if the child is thirsty; and if any tendency to sickness remains, about one-sixth of the water ought to be lime water, which still further neutralises the action of the acid of the stomach and delays the formation of the clot. The water should be boiling when added to the milk, especially in the summer. It gets rid of the infusoria in bad water or in a long-opened tin. Once a day a teaspoonful of Mellin's food may be given with the milk. It is one of the best of the semi-digested foods, and children like it. With such a diet infants who at once vomit cow's milk, who keep their knees drawn up in pain, who are wasted and wretched looking, or in danger of dying from diarrhœa, become contented and happy, rapidly gain flesh, and are able after a time to begin a little weak cow's milk and water or whey. (Dr. F. D. Drewitt, p. 199.)

DIET.—It is generally admitted by authorities on the subject of diet that nitrogen is the most essential of all foods, and that a certain amount—about three hundred grains—should be taken daily. In cases of chronic insufficiency of food, it appears that the diminution in quantity of food most frequently affects the nitrogen. Meat is the article of diet which, as a rule, is the source of the greater part of the needed amount of nitrogen, for, in England, at all events, meat is the popular article of food; and, in cases of chronic starvation, we mostly find that the quantity of meat taken is exceedingly small. "Never a meat-eater," "Do not like meat," "Have got out of the habit of taking meat"—such are common replies made to interrogations of patients under these circumstances. No doubt, meat can be replaced dietetically by other foods containing nitrogen in sufficient quantity; but practically, owing to the habits of families, good substitutes for meat are not easy to find. The weakly one of the family is too often allowed to take her own course, and, if she does not take meat, often gets nothing sufficiently nitrogenous to answer the same purpose. Of all the nitrogenous foods, meat is admitted by all authorities to be the most easily digested, most easily assimilable, and most rapid in its nutritive action. Milk is, of course, a most valuable alternative food; but, in these cases of absence of sufficient meat, we do not find it has ever been taken in any such quantity as to make up for the deficiency; and the quantity of bread consumed, even supposing it to be pure and of good quality, is in such cases entirely inadequate to supply the required quantity of nitrogen. I need not allude to the effect of deficiency in the other constituents of the diet. It is sufficient for my present purpose to show that the nitrogenous elements, while they are of all the most important, are those which are markedly absent in the cases now under consideration. There are few observations bearing on the subject now under discussion which can be quoted from published works. Professor Voit (Untersuchung der Kost, Munich, 1877) mentions an interesting fact. In a public institution, a home for girls, on which, he reports, the diet included an average quantity of 170 grains of nitrogen only, the girls appeared healthy, but their muscles were found to be weak, and menstruation was found to be delayed in many cases until the sixteenth or seventeenth year. Parkes states that when the nitrogen is reduced to from 70 to 100 grains daily, the body gradually lessens in activity, and passes into a more or less adynamic condition, which predisposes to the attacks of all the specific diseases, especially malarious affections, typhus, and pneumonia, etc. It must be assumed from what is known that if the minimum quantity of nitrogen—which, for the sake of argument, we may put as low as 250 grains in the case of a young woman—be not given, a condition of weakness will soon be induced, and with greater or less rapidity, according as the quantity of nitrogen falls much or little below this 250 grains *per diem*. Thus it is easy to understand why, in a year or two, with an average daily consumption of only 100 grains of nitrogen, for instance, important modifications of the nutritive processes are effected, whereby there is produced a direct predisposition to disease. (Dr. Graily Hewitt, Brit. Med. Journal, Aug. 4, p. 225.)

DIGESTIVE FERMENTS.—*Liquor Pancreaticus.*—The liquor pancreaticus of Benger (which Dr. Roberts adopts as his standard solution in his test process for estimating the activity of pancreatic extracts) is a very interesting preparation, and may be viewed in regard to its diastaltic action upon starch, its proteolytic power, and lastly, its emulsive action upon oils and fats. A useful example of the latter is its action upon cod-liver oil, half-an-ounce of which is emulsified by shaking it well in a bottle with a drachm and a-half of Benger's liquor pancreaticus, and twenty grains of sodium bicarbonate. Cod-liver oil thus treated is taken readily, and appears to digest at once from the absence of the oleaginous eructations so often experienced after swallowing cod-liver oil only. If some of this oil so prepared be placed in a parchment dialysing apparatus, and floated in water, a small portion of it dialyses, as is proved by the marked taste communicated to the water. The sodium compound also goes through, as can be shown by taking up a drop of the water on a wire, and examining it in a spirit flame with the spectroscope. It is but right to state that the fats emulsify in the presence of the sodium salt, and without the liquor pancreaticus; but there can be no doubt of the enormous power of the latter in promoting their absorption into the system. Dr. Milner Fothergill says: "In many cases the administration of liquor pancreaticus causes the most satisfactory improvement in the patient's condition. The muscles become plump; the subcutaneous fat once more fills out the wrinkled skin;

the brain is fed; and with this comes back the lost sense of energy, of fitness for work." Its action on milk is worthy of notice. Many persons are unable to take milk or milky food on account of its curdling in the stomach; and this can be prevented by peptonising the milk, which is done as follows:—A teaspoonful of pancreatic fluid is added to a pint of milk, at 120° F., and the milk is allowed to stand under a cosy until a slightly bitter taste is produced; it ought then to be consumed. It has been recommended to boil it for a minute, but I have found it better to omit this, as the digestive process will continue in the patient's stomach. If, however, it be desirable not to consume the milk at once, the digestive action can be stopped by boiling for a minute. Cold milk can also be peptonised; at least, this can be done at the temperature of 60° or 65° F. (the ordinary temperature of a sick room). Some water is added, and a rather larger quantity of the pancreatic ferment, and in about six hours the process will be complete. This peptonising action can be well illustrated by a simple experiment. An ounce of milk, with half its quantity of water, is placed in a test tube, is heated up to 130° F., and twenty minims of liquor pancreaticus are added. At first, if a few drops of acetic acid be added to a portion of it, a copious precipitation of casein is produced. This gradually diminishes, and in twenty minutes the reaction ceases to occur. This explains why it is that patients suffering from irritable stomachs can retain peptonised milk when ordinary milk would be rejected. Its amylolytic action upon cooked starch is perhaps still more striking. If a cupful of very thick arrowroot or gruel be warmed to 130° F., and a few drops of pancreatic fluid added, it almost instantly becomes thin from the digestion of the starch. This opens up a vista of usefulness in the sick room in the preparation of foods containing starch or milk, or both, all that useful class of invalid diet, which the French describe under the name of "laitage;" and these foods can be made easy to swallow and still easier to digest. A good deal can, moreover, be done in regard to peptonising soups, jellies, and blancmanges. This idea is carried out by the very palatable "self-digestive food," consisting of pancreatised farinaceous matter. It is very likely that this will replace most of the infants' and invalids' food now before the public. If Liebig's food be good, this is certainly better, inasmuch as the pancreatic ferments with which it is impregnated are much more comprehensive in their action than mere malt diastase. They will do all that Liebig's food does, and much more, for when this food is mixed with warm milk, they come at once into action, partially digesting both the farinaceous and albumenoid matters, including the casein of the milk, the curdling of which is such a difficulty with infants. It must be always remembered that boiling, even for a minute, destroys the activity of the pancreatic principles; and this must be done or avoided, according to the indications which each particular case may point out. The digestive power of the pancreas upon meat fibre was known to Hippocrates, who recommended dyspeptics to eat cooked meat minced finely and mixed with the raw and finely divided pancreas of a freshly killed animal. In this, as in auscultation, the sage of Cos anticipated some of our best modern discoveries; but these ideas died with him and had to be re-discovered by modern inventors. Mr. Watson Smith, of the Owens College, Manchester, has shown that beef tea prepared by adding a little liquor pancreaticus to the mixture of beef and water after stewing and allowing it to digest for two hours, contained three times as much solid matter (nutritive extract) as a specimen of beef-tea prepared in a precisely similar manner but without the addition of the liquor pancreaticus. An excellent preparation for immediate use is the peptonised beef jelly, a concentrated peptonised beef-tea solidified. It is very agreeable to the palate, and may be taken either cold, as a jelly, or dissolved in a little hot water and seasoned to taste. It is always ready for immediate use, and, being hermetically sealed in tin cases, will keep indefinitely. Once a tin is opened it should be at once consumed as its peptonised character would promote decomposition. The value of liquor pancreaticus is strikingly shown in nutrient enemas, a mode of medication much more ancient than is generally supposed, for there is good reason to believe that the practice was not unknown to the ancient Egyptian and Greek physicians. The most notable example in modern times is that of the late President General Garfield, whose life was much prolonged by their use. Nutrient enemas are made up of soups, eggs, milk, &c., &c.; but it appears to be sometimes not sufficiently remembered that the great intestine has no peptonising power and that much of the nutrient matter is of a colloidal character and cannot dialyse through its absorption apparatus. Peptonising the enema will completely overcome this difficulty, and by rendering the fluid easily transfusible get over the feeling of rectal distension so much complained of. (Dr. F. J. B. Quinlan, Medical Press, Oct. 3, p. 287.)

EMETICS.—*Apomorphia.*—It has occurred to me, in several cases, to have patients who have been obnoxious to ordinary emetics. The emetic has caused nausea and depression, but no emesis. A few weeks ago, two cases of this kind occurred in my practice. One was a man who had been drinking and eating indigestible food. Domestic emetics had been given, which had produced nausea and ineffectual attempts at vomiting. It occurred to me that apomorphia, used hypodermically, might succeed. I prepared a solution containing a grain of chloride of apomorphia, twenty minims of rectified spirit, and water to two drachms, of which I administered ten minims hypodermically, which equals one-twelfth of a grain. In seven minutes, it produced free and copious vomiting. There was no nausea, nor depression, nor intolerance of food. The other case was a man who was a total abstainer. Patient had loaded his stomach with a mass of indigestible food, which had caused acute pain in his stomach. He had tried domestic remedies without success. Pain was so severe, that I was called up at night. The other case having been so successful, I at once administered ten minims of the solution. In two minutes, without any previous nausea or warning, the contents of the stomach were violently ejected on the floor, the patient not having time to get a vessel to vomit into. This was repeated two or three times at short intervals, and the patient had speedy relief. In this case, there was no nausea or bad after-effect. From inquiries which I have made, I am convinced that the value of apomorphia as a safe, certain, and quick emetic, is not appreciated, because not known. In cases of alcoholic and narcotic poisoning, it is a most valuable remedy, and, judging from my experience in one case, the emesis is delayed a few minutes only. In cases of acute gastralgia, and convulsions in children due to overloaded stomach, apomorphia will prove a speedy cure. I have given one-sixth of a grain of the drug to children by the mouth without producing any effect whatever. (Mr. John Brown, Bacup, Brit. Med. Journal, May 12, p. 907.)

EMULSION.—*Castor Oil and Glycerine.*—A mixture which is of an agreeable flavour, and in which the nauseous smell of the oil is efficiently disguised, can be made thus: ℞. Ol. ricini, ʒ j; glycerini, ʒ j; tr. aurantii, ♏ xx; tr. senegæ, ♏ v; aquæ cinnam, ad ℥ss. This forms a beautiful emulsion, is easily taken, even by children, and if administered at bedtime will produce a gentle motion the following morning. (Glasgow Med. Journal, Sept., p. 230.)

Scott's Emulsion of Cod-Liver Oil.—This is an American preparation of cod-liver oil emulsified with glycerine. From the formula printed on the label, it would appear that it contains fifty per cent. of pure Norwegian cod-liver oil, with six grains of hypophosphite of lime and three grains of hypophosphite of soda to the fluid ounce. It is palatable;

and we have no doubt that many patients who have a repugnance to ordinary cod-liver oil, would take it without difficulty. (Brit. Med. Journal, July 7, p. 17.)

GASTRIC PAIN. — The sub-nitrate of bismuth, an insoluble powder, has been given for the relief of gastric pain in such large doses that, after death, large, hard, black masses of concrete sub-nitrate and sulphide of bismuth have been found blocking the intestinal canal. The gentleman who made the post-mortem said the masses he removed looked like lumps of metal. *Corpora non agunt nisi soluta*, say some. If this be accepted as a principle, what can be expected but painful intestinal obstruction as a result of perseverance in the administration of large doses of insoluble substances? (Dr. J. C. Thorowgood, Med. Times, June 30, p. 725.)

HARE LIP.—*Operation for.*—What may be called the third and most important step in the operation is the cutting of the flaps; but before attempting their scission it is a good plan to apply a suitable pair of clamps for the prevention of hemorrhage during this stage and throughout the subsequent process of suturing the newly freshened surfaces. In order to facilitate the proper performance of flap section, you will find it advisable (the clamps being accurately fixed) to make use of two pairs of fine artery forceps, one being placed at the nasal, while the other grasps the lower extremity of the fissure. In this way the labia can be put lightly on the stretch, which renders the requisite incising easier, cleaner, and neater. It is the general custom to pare the edges with a knife; but there are many, including Dr. Wheeler, Mr. Butcher, and M. Malgaigne, who advocate the use of scissors specially devised for the purpose, and who claim for these a superiority over other instruments. (*Woodcuts* of Dr. Whitson's clamps and Dr. Wheeler's scissors will be found at pages 277 and 279). What kind of suture shall we call into requisition for the approximation of the recently pruned edges? The metallic, consisting for the major part of silver wire, chromicised catgut, horse-hair, silk, the bead or quilled, and the hair-lip needle, have all been tried and advocated. I would advise you to give a preference to either of the first two. Silver wire, though not without drawbacks, makes an excellent suture, and a tolerably thick thread should be selected. It is less liable to cut when not too fine, it fulfils its mission better, and forms a fast knot, the ends of which should be laid flat in order to lessen their chance of catching. Chromicised catgut acts beautifully and needs no further care. It possesses an inherent adaptability which wire, however ductile, can never acquire. Horse-hair, though by no means destitute of advantages, is not to be specially lauded. Owing to its fineness, it is somewhat prone to cut if subjected to any strain; the pliancy of gut is awanting, and, unless care be taken in its ligation, it is almost certain to be laxly done and thus slip. On the other hand, no stitch is more easily withdrawn, and, unless forced by tension to eat its way towards the exterior, little trace of its presence can be afterwards seen. I have found silk best suited for approximating the prolabium, and in this capacity you will find it handier than hair. The needles were at one time universally approved of, but they have to a great extent been discarded by most surgeons. They leave a mark necessarily enlarged by tension and in proportion to the length of time they are allowed to remain *in situ*. The compression exercised by them is apt to trespass upon the vitality of the neighbouring parts, while the thread which is wound round them conceals the lips, becoming, when soaked with blood, a stiff and unyielding mass. Should you be forced in an emergency to try the needles, you will find it convenient, after having placed them in position, to appose the raw surfaces before putting on the silk: and the latter ought to be of a coarse kind in order to spread the area of pressure and minimize ulceration. It is needful to withdraw the pins at the end of forty-eight or seventy-two hours, certainly, at the latest, on the fourth day, which procedure alone bears strong testimony in favour of their rejection, because union is at this time by no means firm, and any untoward movement may react prejudicially. Under these circumstances it is desirable, so long as cohesion is progressing between the labiæ, to have a class of sutures at our command which will enable us to keep the parts at rest and evade taxing the elasticity of the commissure. Furthermore, two needles cannot divide the strain so equably, or afford the relative support of three stitches of wire or gut. In passing the sutures, a curved needle is the best to work with. It is preferable to a straight one, because it adapts itself more readily to the natural conformation of the parts, and it should be made to penetrate the entire thickness of the lip, with the exception of the mucous membrane. In its manipulation a needle-holder will assist you greatly. The needle of Lister, with a groove above the eye, into which the suture is designed to sink, is the most convenient for this purpose. The cannulated needle of Dr. M'Lellan of Philadelphia (of which a *woodcut* is given) might be tried. The inventor claims that the handle offers firm support to the fingers of the operator, while great accuracy in the introduction of the sutures and complete exactness in the apposition of the parts are attained. (Dr. James Whitson, p. 276.)

Hemorrhoids.—*Modern Plan of Treatment by Ligature.*—The ligature has long maintained its supremacy in the treatment of piles, and no method has yet been proposed which can completely supersede it, as there are still examples of the disease which cannot be mastered in any other way. The old mode of using it was painful in the extreme, and carried out for years without the merciful aid of anæsthetics, must have been enough to deter the surgeon from resorting to it. The entire of the base of the tumour was tightly constricted with whipcord. We have then the improvement of Brodie and others, who transfixed the neck of the tumour and tied it in segments. Bushe, of New York, has recommended some ingenious instruments for this purpose, but if you desire to practise it the modern plan will be found more efficient and very much less painful. The patient having been duly prepared and the legs secured in the manner directed for all these operations, the sphincter should be paralysed by stretching with the fingers. This will encourage the protrusion of the hemorrhoids, and facilitate immensely the future steps of the operation. The tumour which is to be subjected to operation should be caught by a tenaculum, vulsellum, or the hook designed for the purpose, and given in charge to an assistant, who draws it down steadily. With a short, straight scissors the pile should be separated from its connections with the muscular and submucous tissue, upon which it rests, to such an extent that it shall be connected by an isthmus of mucous membrane containing the large vessel which supplies it with blood. Around this a strong ligature well waxed should be slipped to the very summit and there securely tied. The extremity of the pile and the ligatures may be cut off, but care must be taken to leave enough of both to prevent the knot from slipping. It may be necessary, by a second application of the scissors, to detach the pile from an adjacent tumour, so as still more to narrow the pedicle to be tied. To properly aid you a little dexterity is required of your assistant. Having the tumour well secured in the pronged hook, he should first draw it away from the wall of the bowel towards the anal opening, to admit of the due application of the scissors to the groove which separates the pile from the margin of the skin. When the ligature is lodged deeply in the incision the hook should be rapidly passed to the other hand, and the pile now drawn in the opposite direction, so as to facilitate the knotting of the ligature over the pedicle of mucous membrane. As to the best material to use for this purpose there is some difficulty. I have seen a patent platted silk cord used for this purpose, and which had great strength when simply stretched, break off at the second knot—a very awkward occurrence. Whipcord answers well, but I have found nothing to equal three strands of common shoemakers' hemp gently twisted and then well rubbed with shoemakers' wax. This will bear any strain; the first knot will remain fixed until the second is tied; it will not crack across at the knot, and it is not permeable by the fluids of the intestine. Several tumours may be thus dealt with in detail. A piece of ice may be passed into the bowel, and a light dressing of absorbent cotton or fine tenax secured by a T bandage. In the evening the dressing should be changed, and a morphia suppository introduced. The bladder should be carefully watched, as retention of urine is likely to follow this or any operation on the rectum. If possible the bowels should be kept from acting for two or three days. The knots separate and are discharged in about eight days. It is desirable that the patient should be confined to a sofa for about a fortnight after the operation, but they sometimes feel well enough to go about and transact business. (Mr. E. Hamilton, Surgeon to Steevens' Hospital, Dublin, p. 306.)

Nitric Acid and Caustics.—For the vascular tumour of the rectum, the nævoid pile, Mr. Houston has insisted on the value of nitric acid, and this practice has received the sanction of almost all surgeons for this special variety. The mass being made to protrude at the anus, the surface immediately surrounding the pile should be coated with olive oil. The surface of the tumour should be touched with a stick dipped in nitric acid until it assumes an ashy gray colour. Oil should then be applied and the parts returned. I have used the following modification of potential cautery for a single tumour: Take a common surgical needle, and, having some nitrate of silver melted in a porcelain capsule over a spirit lamp, coat the needle with caustic to within a line or two of the point, which should be left clear for the purpose of piercing the pile, which should be transfixed. The caustic thus melts in the anterior of the mass and causes its cousolidation. On the same principle I have seen them injected by means of a hypodermic syringe with a solution of perchloride of iron or of ergotine. The injection of iron-salt into vascular or nævoid tissue has been followed by fatal embolism. Carbolic acid has also been suggested for this purpose. (Mr. E. Hamilton, p. 310.)

Clamp and Cautery.—The treatment by the actual cautery, as practised by Cusack, Lee, and Henry Smith, is, beyond doubt, a safe, sure, and most thoroughly effective means of dealing with the disease. We have seen that Mr. Cusack first resorted to it as a means of controlling the bleeding after the use of nitric acid, but subsequently adopted it as a primary operation—piercing the pile with pointed cauteries resembling these now used for nævi, at other times using a clamp guarded with wet chamois leather. I think we are indebted to Mr. Henry Smith for having established this mode of treatment on a sound surgical basis. This operation with the clamp and cautery you have often seen in use in the hospital in severe cases of piles. The patient having been prepared and placed in the proper surgical position and the sphincter stretched, the tumour having been protruded, one of the piles is to be grasped in the usual way with tenaculum or forceps, and drawn well down; it is then caught between the blades of the clamp. The blades are protected with ivory, so that should they become heated by contact with the hot iron, they will not burn the adjacent parts. You should further observe that the blades are fitted with a spring to open them, and a screw to keep them closed. For ordinary operations I have found it advantageous to have them narrower and thinner in the blades than those usually sold at the instrument makers. The pile having been adjusted within the blades, they are to be screwed home. The portion which projects beyond the forceps should be cut off with a knife or scissors. In doing this you must be careful not to cut off the entire of the tumour on a level with the clamp. If you do so the tumour may slip from it in the next stage of the operation. The cut surface should now be wiped dry, and the cautery at black heat almost, but not red, should be lightly passed over the cut surface. You must never forget that for staunching bleeding you should use only black heat; for destroying tissues, you must apply it red or white. You have in the *thermo-cautery* of M. Paquelin, which is now used in this and every hospital, a beautiful application of science to surgery. By it you can regulate the amount of heat with the most extreme delicacy. You have often seen used here for this purpose a scissors heated by this instrument, by which the cutting and searing are simultaneously performed. The blades of the clamp should now be carefully relaxed a little by a turn of the screw to see if there is any bleeding. Should such exist the instrument must be at once screwed up again, and the bleeding point touched with the hot iron. In this way the several tumours may be dealt with in detail. The bowels may not be acted on for a day or two, and when they are about to move, the injection of an ounce of olive oil from a gum elastic bottle will facilitate their action and diminish pain. (Mr. E. Hamilton, p. 310.)

Crushing.—A mode of operating by clamp only has been recently introduced into practice. This clamp has been constructed by Mr. Benham, to carry out the treatment of Mr. G. D. Pollock of St. George's Hospital, by whom it is approved and used. Without enumerating other advantages, it is pointed out that it so completely crushes the pile, as to leave only a slight fringed remnant, without any pain or bleeding, rendering the convalescence of the patient a matter of a few hours. The patient suffering from hemorrhoids, being prepared for the operation in the usual manner, is placed under the influence of an anæsthetic. He is then turned on his left side; the right leg is well flexed and fixed with a strap, which is carried under the knee and round the neck. The pile to be removed is drawn well down by pronged hook or forceps. The clamp is applied to the base of the pile, and at once tightly and firmly closed by the action of the screw at the end of the handles, The portion of pile which protrudes inside the lips of the clamp is then removed by a pair of curved scissors or an ordinary scalpel. The clamp should afterwards be retained, still grasping the remnant of the pile, for about two minutes. If, after removing the clamp, there should be a slight oozing from any point of the fringed remnant, this may readily be arrested by the application of the torsion-forceps or a fine ligature (this process is, of course, to be repeated according to the number of masses to be got rid of). The dressing employed after the operation is completed is usually tarred cotton, or that prepared with salicylic acid, with warm bathing. (p. 311.) (Mr. Edward Hamilton, p. 301.)

HERNIA.—*Permanent Cure by Subcutaneous Injection.*—I attribute my success in the operation mainly to three things. 1st, The use of a stimulating mixture, 2nd, the use of an instrument the needle of which revolves and distributes the fluid more effectually than any instrument made upon the pattern of a hypodermic syringe. (This instrument is made by George Tiemann of New York, for whom W. B. Hilliard and Sons, 65, Renfield Street, Glasgow, are agents). 3rd, the use of a truss as soon as possible after the operation. It is evident that an ordinary truss cannot be very early applied to the parts which are in a state of inflammation. For this reason I devised a truss, the pad of which is flat, and made of silver wire gauze. I call it the anatomical truss. It tends to keep the rings together, rather than to force them apart, as every stuffed pad must do. (See woodcuts, p. 286.) The hernia must be reduced. Irreducible hernia may often be reduced by patient trials. Taxis is to be aided by position, by ether, by ice poultices, and by subcutaneous injections of morphia sulphate and atropia sulphate, combined or separately. Adhesions may be broken by manipulation or by subcutaneous division, or the tumour may be gradually reduced by an elastic cup truss. The hernia being reduced, the middle finger of the left hand is carried up into the opening of the external ring, the scrotum being invaginated. The reduced intestine is held back by this finger. The tip of the index finger placed in its natural position by the side of the middle finger, points to the site of the puncture for the needle of the syringe. This puncture is opposite the external ring. It is not made through the scrotum, but through the skin of the abdomen in the inguinal region. The needle is passed carefully into the canal, avoiding the cord and the vessels. It is evident that the operator must be a good anatomist and a skilled surgeon. The finger being in position the fluid is forcibly injected along the tract of the canal—not into the sac nor into the peritoneal cavity. The fluid is still injected as the needle is withdrawn, and at the same time the needle is revolved so that every part of the canal shall be bathed with fluid. The syringe which I have devised for my own use does this automatically, for, on opening the valve by pressing the lever, the spring on the piston rod forces out the fluid through the holes in the sides of the needle, which is at the same time rotated by the act of withdrawal, owing to its twisted form. I do not say that this instrument is necessary for a perfect result, but it makes the operation easier and simplifies the injection, so that the result is more likely to be favourable. The common hypodermic syringe will not answer, for it delivers the fluid against the sac, and not on the walls of the canal; and the scarf point is dangerous, as arteries may be wounded by it. An instrument which delivers the fluid only in drops is not of as much value as one that sprays the fluid forcibly on to the tissues. When the injection has been made the ring will be felt to contract like a sphincter round the tip of the finger, and from my experience I do not expect a favourable result unless I feel this contraction. When the needle is withdrawn the finger is to be placed over the puncture to prevent the escape of fluid. This is also guarded against by making the puncture with the skin drawn tense and thus making a valve-like puncture. The amount of fluid varies with the size of the hernia and the irritability of the tissues. The larger the hernia and the older the patient, the more stimulating should be the fluid, and the greater the amount injected. Inguinal hernia requires the greatest amount, while femoral requires the least—about one-half as much as inguinal. The fluid I use is made according to one of three formulæ given at p. 289. (Dr. J. H. Warren, p. 282.)

Treatment of the Sac in Hernia.—Mr. McGill recommends one of the following four methods. 1. The sutures may be inserted through both skin and sac at the same time: in other words, the wound may be treated like any other abdominal wound, and stitched up in the same manner as the incision after ovariotomy or other abdominal section. This method of completing the operation is one which would, I suppose, naturally occur to any surgeon whose surgical experience is of recent date, and may be considered the first step towards an improved method of procedure. Though inferior to methods to be described further on, it is still applicable in certain cases. 2. The sac may be separated from the tissues external to it till a free margin is obtained. These may be brought together by means of catgut-sutures, and the skin afterwards approximated by another row placed more superficially. This method is, I think, preferable to that already described, as a more perfect closure of the sac can be effected. It may be adopted when complete separation of the sac is impossible. 3. The sac may be dissected out, ligatured at its neck, and removed. This, in my opinion, is the best course to adopt; it presents two great advantages. It most effectually closes the abdominal cavity, and it to a certain extent prevents the recurrence of the rupture; in other words, it diminishes the risk of the operation, and it improves the result. The separation of the sac from the surrounding tissues is sometimes a tedious, sometimes a very simple, proceeding; speaking generally, we may say that, in cases of femoral hernia, the separation will be effected with little trouble; whereas, in inguinal hernias, especially if of long standing, and of large size, some difficulty may be expected. When separated, a stout No. 3 catgut ligature is applied, and the sac is removed with scissors. 4. The neck of the sac may be ligatured and the sac left in position. I am unable to give any case in which this has been done, as I have not as yet had an opportunity of putting it in practice. It is a plan which I think might prove useful in cases of congenital hernia. In these cases, as the sac is the tunica vaginalis, it is plain that it cannot be removed. I would, therefore propose, after carefully separating the cord, to ligature the neck, and in this way effect artificially the division which should exist naturally between the cavity of the peritoneum and that of the tunica vaginalis. (Mr. A. F. McGill, p. 290.)

Radical Cure of Hernia.—I made an incision as for strangulated bowel, and opened the sac. I reduced the bowel, and then found that the crural ring was large enough to admit three fingers; lying at the posterior part of the sac was a large portion of omentum, which was adherent to the sac, and, as in separating these adhesions the omentum was freely handled, I removed the portion which had been in the sac, and tied the stump with a stout silk ligature, leaving the end of the ligature long. I then dissected out the sac, and, after ligaturing the neck, removed the entire sac. I had next a large piece of omentum removed by a ligature within the abdominal cavity just opposite the crural ring, the ligature being brought out through a small opening I had made in the peritoneum close to the ligatured neck of the sac. It now occurred to me that I might use this omentum as a plug to close the crural ring. I therefore drew the omentum down until it was in contact with the neck of the sac, and found that it remained in its new position without much tension. I thus had the ligatured neck of the sac and the ligatured stump of the omentum to resist the return of the hernia. The wound was closed in the ordinary way, the two silk ligatures being brought out at the lower end. It is now five months since the operation, and the result so far has been perfectly satisfactory. The brilliant results obtained by Mr. Banks, of Liverpool, and Mr. Spanton, of Hanley, in dealing with inguinal herniæ, led me to undertake the operation just described, and Mr. Spencer, of York, has performed a similar operation with like success. (Mr. Walter H. Brown, p. 295.)

INFANTILE CONSTIPATION.—Take one quart of bran meal, tie it up in a pudding-bag so tight as to get a firm solid mass, put it into a pot of water early in the morning, and let it boil till bedtime; then take it out and let it dry. In the morning peel off from the surface and throw away the thin rind of dough, and with a nutmeg-grater grate down the dry hard mass into a powder. Of this from one to three teaspoonfuls may be used by, first, rubbing it into a paste with a little milk, then adding it to about a pint of milk, and, finally, bringing the whole to just the boiling point. It must be given through a nursing-bottle. I have seldom known the above fail to give relief. (Mr. Matt. C. Hatton, Barnsley, Lancet, July 14, p. 89.)

INFANTILE DIARRHŒA.—In every case, I enjoin total abstinence from milk—the mother's, or the milk of the cow, as the case may be, and order, as a substitute, arrowroot prepared with water, some sugar and port wine being added; and it is wonderful how much wine given in this way an infant of a few months will consume and require; beef-tea, carefully prepared and freed from fat; and, when available, condensed milk, its use being unobjectionable from its being freed from casein, the irritating element in milk. An equally important requirement is absolute rest in the recumbent position, with sufficient warmth to the extremities and surface of the body, counter-irritation over the abdomen by poultices, a sinapism if required, and, failing other remedies, a small blister over the liver, as we have, in almost every instance, congestion of the hepatic system and functional derangement, and tenderness on pressure—this form of counter-irritation will be found most salutary and rapid in giving relief. As medicine I have long since dispensed with the old chalk mixture and astringent tinctures, having found them in practice too often acting as irritants to the sensitive mucous membrane of the bowels. My chief reliance is placed upon dilute sulphuric acid, either with or without the addition of laudanum in regulated doses. It is desirable to give it singly in most cases, as it may then be ordered after even loose motions with safety, whereas when combined with opium it can only be administered after express intervals. This remedy cannot be used, however, with the necessary freedom while the ordinary practice of milk-feeding prevails, as it is almost certain to induce colicky pains by the separation of the curd in an indigestible form, and thus increase the sufferings of the infant. (Dr. A. Harkin, p. 197.)

Medicines for Children Rendered Palatable.—We are now enabled to give the most nauseous of drugs—*castor oil*—absolutely free from taste and smell, while it retains the full aperient properties of ordinary castor-oil. Messrs. Allen and Hanburys themselves advise that it should be shaken up with three or four times its bulk of hot milk. The viscidity of the oil is thus avoided, and the emulsion produced is scarcely distinguishable from warm rich milk. If it be desirable to administer an *aperient* that will act more directly on the liver, and to avoid the unpleasant effects which often arise after taking "oil," the compound rhubarb pill will be found a serviceable aperient. Of course, some new method of administration will be desired, which I shall now detail. Either an ordinary five-grain pill may be cut up, and a portion of it broken in small pieces may be buried in a chocolate cream, which the youngest child will take with avidity; or for children of, say five years and upwards, I have given one-half and one-fourth of a grain of this pill, thinly coated. Half-a-dozen or so may be taken, like "hundreds and thousands," and washed down with milk or water. The *medicated fruit lozenges* are very useful, *e.g.*, tamar indien and laxora lozenges. Podophyllin is probably one of the active ingredients in these lozenges. Only a small portion of a lozenge must be given to a child. The objection found with these is that they sometimes "gripe" the little patient.

Next to these, perhaps, in efficiency and palatability is the compound liquorice powder, containing senna powder. About a teaspoonful stirred up with warm milk may be taken at bedtime, and a little chloric ether added (about ten to twenty drops). Very few children will object to take fluid magnesia or the calcined magnesia, especially if flavoured with the syrup of mulberry or orange. I have succeeded in masking the taste of many *powders* by the addition of powdered "rose" lozenges. I very seldom prescribe Gregory's powder, on account of its nauseous character and bulk. I prefer to combine the rhubarb with bicarbonate of soda about five grains of each. This makes a much more miscible and manageable powder. Given in jam, honey or golden syrup, the taste is altogether covered. Children will sometimes take the "baume de vie," or *decoction of aloes*, without objecting much. A little of this rubbed into the stomach of infants will suffice sometimes to procure an action of the bowels. The extract of liquorice may be added to the decoction until the bitter taste is sufficiently masked. Children have not really such an aversion to it, for I have known them to lick off the aloes from their fingers when put on to prevent them from sucking them. Powdered aloes, about half a teaspoonful, may be given mixed with brown sugar. The electuary of senna is taken without difficulty by some children, also the syrup of senna and the infusion with prunes. The effervescing purgative lemonade is a very agreeable drink, as also half a seidlitz-powder flavoured with lemon-juice. Turning now to *febrifuge mixtures*, there is not much need of flavouring to mask the flavour of these. Sweet nitre, acetate of ammonia, spirits of chloroform, are all pleasant drugs to take. The nitrate and chlorate of potash are rather saltish, but the sal prunelle and Wyeth's compressed tablets will be taken by the bigger children without much protest. The syrups of orange, lemon, and mulberry, will come in as agreeable and cooling adjuncts. Cough-mixtures can generally be made very pleasant by the addition of syrup of squills, of tolu, &c. As regards *tonics*, some considerable skill will be necessary efficiently to cover the bitter flavour. Children will take the saccharated carbonate of iron very well, and also steel wine; but if we attempt to give the bitter infusions, there is sure to be rebellion in the nursery. Quinine—one of the most valuable medicines for children—can be given without difficulty, either in the form of pill or, which I prefer, dissolved in syrup of orange, without the addition of any water. This effectually covers the flavour. Quinine wine is useful for the elder children. *Chemical food* is, of course, taken with relish, and if recently made is a serviceable tonic; but the phosphates, from their insolubility, throw down very much. The compound solution of the hypophosphites, in ten-minim doses, and the hypophosphite wine, forms a perfect substitute for Parrish's food. Besides having iron in a form which is easily absorbed, the hypophosphite of magnesia serves as an useful antacid and stomachic in this combination. With a view of putting into practical form these few suggestions, and to systematise the irregular but constant attempts of mothers to keep a little dispensary of their own, I have instructed Messrs. Savory and Moore to fit up a *nursery medicine-chest*, with a companion guide, to assist mothers, especially those residing in the colonies and far away from medical aid, to treat their own children in such emergencies. (Dr. F. Churchill, Brit. Med. Journal, June 9, p. 1114.)

Obstructions of the Bowels.—In cases of this kind it is often difficult to say where the obstruction is likely to be found in an operation. Dr. Fowler suggests that the auscultation of the colon and cæcum during the administration of an enema should never be omitted, as it often affords valuable information as to the site of the obstruction, and so to some degree indicates the line of treatment to be followed. If during the injection the fluid can be distinctly heard gurgling in the cæcum, it may be considered almost certain that the obstruction is in the small intestine. If the flow of fluid is stopped at some intermediate point in the colon, it is very probable that the obstruction is situated at that spot, but the indication is not so certain, as a case is recorded in which fluid injected into the rectum flowed out as fast as it was poured in, and this being taken as an indication that the sigmoid flexure was the site of the obstruction, colotomy was performed in the left loin. On the patient's death from continuance of the obstruction, its site was found to be the small intestine. A possible fallacy in this test is that the movement of fluid in the bowel beyond the obstruction, owing to increased peristalsis, may be mistaken for the gurgling sound produced by the fluid injected. In the last four cases of obstruction, however, which I have met with, and have seen this test used, it has given trustworthy indications. I have lately repeated the experiments on the cadaver made by A. Hall in 1846, and by others since with the view of testing the competency of the ileo-cæcal valve, and find that on injecting water into the colon its passage into the ileum is arrested at the valve, and that the greater the tension of the fluid in the cæcum the more closely are the edges of the valve approximated. In one experiment some air passed through the orifice; this is probably due to the fact that in the cadaver the normal tonicity of the sphincter is lost. I think there can be no doubt that the ileo-cæcal valve in the living body under normal conditions does effectually prevent the passage of fluid or air from the cæcum to the ileum. I am aware that cases are recorded tending to prove that as the result of an anti-peristaltic action fluid and solid materials injected or placed in the rectum have passed the ileo-cæcal valve; but even if this be so, it does not follow that any mechanical effect can be produced on the interior of the small intestine by rectal injections. If therefore the obstruction appears to be in the small intestine, it is useless to persevere with enemata, the only effect they might possibly produce being an increased peristalsis in the lower portion of the ileum, and all authorities agree that one object of treatment in intestinal obstruction is to diminish as much as possible the excessive peristalsis. If, however, the obstruction appear to be in the colon, there is a fair chance that it may give way before the continued use of warm enemata, or inflation of the bowel with air. Under almost all circumstances it is advisable to get the patient partially under the influence of morphia without delay, thereby checking the vomiting and peristalsis, relieving the pain, and warding off the onset of collapse. (Dr. J. K. Fowler, p. 204.)

SULPHATE OF MAGNESIA AS A SALINE APERIENT.—Sulphate of magnesia is one of the best forms of saline aperients, and the old-fashioned stock medicine of the surgery and of hospitals, the mistura alba, has more cures due to it than will ever be achieved by a dozen of the new-fashioned remedies which have lately inundated the advertising pages of our journals. I say that Epsom salts have gone out of vogue, but a tacit compliment is notwithstanding constantly being paid to them, for people still find out the efficacy of the solutions which contain them, and they take our old friend in a more expensive form under the names of Friedrichshall, Hunyadi János, and Æsculap mineral waters. (Dr. C. J. Hare, Brit. Med. Journal, July 28, p. 154.)

TAMAR INDIEN AS A PURGATIVE.—We do not remember having heretofore met with an account of the exact composition of this favourite and undoubtedly active purgative, but according to M. Schmitt in the Répert. de Pharm., it is nothing but an electuary of senna made up into a tempting bonbon of complex formula: Tamarind pulp, 450 pts; powdered sugar, 40 pts; powdered sugar of milk, 60 pts; pure glycerine, 50 pts; M. Evaporate to consistence of soft extract. Add—Powdered senna leaves, 50 pts; powdered anise, 10 pts; essence of lemon, 3 pts; tartaric acid, 3 pts; M. Divide into 100 boluses.

Steam them, and roll in the following mixture: Cream of tartar, 5 pts; white sugar and sugar of milk, āā 35 pts; tragacanth, 2 pts; tartaric acid, 2 pts; powdered red sandal, 25 pts. Dry and put up in tin foil. (Dr. Walter G. Smith, Dublin Med. Journal, Oct., p. 304.)

TAPE-WORM (TÆNIA MEDIOCANELLATA).—*Extract of Male-Fern.*—The dose of extract of male fern recommended in the British Pharmacopœia is from 10 to 30 minims; and not alone from my experience in this case, but in a few others also, I believe this dose to be quite inefficient; more especially in cases of tænia-mediocanellata, which is generally acknowledged to be a more difficult parasite to dislodge than tænia solium. I would not feel justified in ordering, on the first occasion, such a large dose as that given previous to the final expulsion in the above case—viz., three drachms; but I think we are certainly safe in giving from one drachm to one and a half drachms, and repeating it in a few hours if the worm be not expelled in the meantime; and then, should a recurrence take place, we may increase the size of the dose, more especially if it had been well borne in the first instance. (Dr. C. Y. Pearson, p. 202.)

AFFECTIONS OF THE URINARY SYSTEM.

CYSTOTOMY.—The selection of a method for opening the bladder should have reference only to the object to be attained, or the contingencies that may arise. If, for instance, we desire merely to introduce the finger into it, as a preliminary to extracting a small stone, the median operation answers perfectly; whilst, if a larger stone, or an unknown quantity of anything, has to be dealt with, the lateral incision will, as a rule, be preferable. It has been advanced by those who favour the median incision, which is practically an urethrotomy, that it is both simple and safe; its admitted disadvantage lies in the comparatively small space it provides for manipulating and extracting; whilst, on the other hand, the lateral incision, though affording more room, is considered to be attended with an increased risk and a greater degree of difficulty, so far as its performance is concerned. The median operation need not necessarily involve anything more than the opening of the membranous urethra. The completed lateral operation further includes the division of structures constituting the neck of the bladder; and it is to this part of the proceeding that any increased risk or difficulty is to be attached. A little reflection shows that it is possible to closely assimilate the lateral with the median operation, that is to say, to dispense with the incision, not to the staff, but along the staff, should it be found, on exploration with the finger, that the additional room which the latter part provides is unnecessary for the object in view. It need hardly be said that this modification of the lateral method, where it is found, on digital exploration, to be feasible, frees the operator from executing the only portion of the operation to which any increased risk is attached; whilst, on the other hand, he has the consciousness that, should it turn out to be necessary, he can, by the completion of the deep incision along the staff, avail himself of all the advantages which are conceded by surgeons to the lateral method of opening the bladder. (Mr. Reginald Harrison, p. 313.)

DIABETES.—*Chemical Pathology.*—Holding the views with regard to the assimilation of the carbo-hydrates, which are given at pages 221-2, Dr. Pavy believes that, in diabetes, the action of the liver on them is reversed, and that starch is converted into glucose; and that, further, glucose is probably produced from bodies not belonging to the group of carbo-hydrates, by a reversal of the action referred to. It can be shown experimentally that the liver, when supplied with blood which contains an excess of oxygen, that is to say, with blood which is not thoroughly venous, can convert starch into sugar. If the liver contain a considerable excess of sugar, so also must the blood leaving it; and, when the blood contains sugar, it is always excreted by the kidneys in proportional amount. Glycosuria being assumed to be due to abnormal fermentation of the carbo-hydrates of the liver, and this abnormal fermentation being attributed to an excess of oxygen in the portal blood, Dr. Pavy propounds a theory which, by accounting for this excess, will account for diabetes. If in any area the vaso-motor system be paralysed, the circulation through that area becomes so quick, that the blood, when it reaches the veins, still has the characters of arterial blood. In diabetes, Dr. Pavy supposes that there happens a palsy of the blood-vessels of certain areas of the organs which make the chyle, and that thus the portal blood, owing to the hurried circulation which takes place in certain parts, comes to contain too much oxygen. Diabetes is a progressive disease; it may be held in check, it may seem for a time to be cured, but it always comes back, and, sooner or later, its victims, by slow or rapid stages, succumb; this we are told to account for, by supposing that larger and larger areas are, step by step, involved in the palsy. (Brit. Med. Journal, p. 221.)

Bromide of Potassium.—Last year M. Felizet presented, in August, to the Académie de Médecine a work entitled "The Cure of Diabetes Mellitus and Glycosuria by Bromide of

Potassium;" and now we have before us the report of the commission appointed to inquire into that paper. From a therapeutical point of view, the numerous theories of diabetes may be divided into three classes, according to the report. The alimentary, hepatic, and nervous theories are the names adopted. Each of these hypotheses has had its own therapeutics. M. Felizet believes that he can cure diabetes with bromide of potassium. His belief is based on the results of clinical and experimental researches. Glycosuria induced by puncturing the floor of the fourth ventricle of rabbits ceased sooner under the administration of bromide than when left alone. (Lancet, Sept. 22, p. 511.)

ENLARGED TESTICLES.—*New Method of applying Pressure.*—I may preface the explanation of my plan by saying that I derived the idea from a homely source, nothing more or less than seeing the means employed for encasing a football; barring, that instead of having the encasing material made of leather, I would have it made of Indiarubber—such as one sees in the construction of the balls in spray producers, &c. The cases I recommend should be made of different sizes and thicknesses, oval in shape (same shape as the Rugby football when inflated). The means of tightening the cases and applying the pressure would be identically the same as in the football cover—*i.e.*, by lacing. There should be an opening at the neck of the case to allow the passage of the cord. This opening would be surrounded by a ring (interrupted) of leaden wire, to ensure its patency and to prevent pressure on the structures of the cord. The leaden wire ring being interrupted, its softness would offer no obstacle to its easy adjustment round the neck of the enlarged gland. With a supply of the cases which I have attempted to describe above, the treatment of an enlarged testicle would offer but little difficulty; it would simply mean the selection of a rubber-case of the right size and thickness, and capable when laced up of exercising a steady equable pressure on the enlarged organs, and applying the case to the testicle and lacing it up. (Dr. J. L. Corbett, Lucknow Central Prison, Lancet, July 7, p. 11.)

LITHOTOMY OPERATIONS.—At the Calcutta Medical Society, Dr. Wilson described his method of operating for stone in India. No preparation is required, and the operation may at once be performed, and there is no need of tying the hands and feet if two assistants are at hand to hold the thighs well back, the patient lying on his back with the buttocks well to the end of the table. It does not matter whether the bladder is empty or full. Having passed in the grooved staff, and ascertained by digital examination the position and condition of the rectum, he holds the staff in the left hand, and with the right enters the point of a common scalpel at the median line about half an inch above the anus, and turning its edge to the operator's right, lets its point rest in the groove of the staff, pushing it down an inch or more until it enters the prostate. This done, he withdraws it to the place of first contact with the staff, and completes the incision by withdrawal of the knife, cutting outwards and downwards so as to cause an incision large enough to admit the forefinger. If an adult, he dilates fascia and prostate with the finger till it enters the bladder, withdraws the staff, and extracts the stone with forceps. If a boy, it is safer to dilate with some small instrument, such as a grooved director, before attempting to insinuate the finger, or the urethra may become torn across, and the bladder pushed away beyond reach. "The present writer knows of no other operator who holds the staff himself. The advantages claimed are, that the groove of the staff is more readily reached, and the deep incision more safely made. Some of the advantages claimed for this mode of operation—that is, by entering the point of the knife direct into the groove, and completing the incision on withdrawal—are, that holding the edge of the scalpel to the right, it is scarcely possible to wound the rectum; that if the arteries are distributed regularly there can be no considerable bleeding; and that there is no unnecessary cut surface, and the wound heals in less time." (Dr. Wilson, Med. Times and Gazette, April 28, p. 472.)

Precipitation of Phosphate of Lime from Urine by Heat.—*Conditions affecting.*—The fact that clear urines, free from albumen, and neutral or even faintly acid in reaction, frequently yield a precipitate upon heating, is familiar to every one. The explanation commonly given is the expulsion by heat of the free carbonic acid, which is supposed to hold the calcium phosphate in solution. This explanation does not rest upon a sound basis, and is disproved, *inter alia*, by the fact that the precipitate will frequently clear away in part or whole when the urine is thoroughly cooled. This latter curious fact appears to have been unaccountably overlooked until pointed out by E. Salkowski, in a recent number of the *Zeitschrift fur Phys. Chemie*, 1883, p. 119. As a rule, no alteration in the reaction of the urine is noticeable after boiling. Salkowski adduces experimental reasons for believing that the phenomenon depends upon the formation of a combination of calcium phosphate ($Ca_3\ P_2\ O_8$) and alkaline phosphate, which is easily decomposed by heat; but he does not attempt any precise explanation of the facts. From some experiments which I have made in conjunction with Dr.

Emerson Reynolds, it appears probable that the production of the precipitate depends upon a nice adjustment in the proportions and basicity of the phosphatic salts existing in the urine. The following equation may express the precipitation which occurs upon applying heat: $2\,(Ca_2\,H_2\,P_2\,O_8) + Ca\,H_4\,P_2\,O_8 = Ca_3\,P_2\,O_8$ (insoluble); $+\,2\,(Ca\,H_4\,P_2\,O_8)$ (soluble). Upon reduction of the temperature, the inverse change takes place, attended with resolution of the precipitate in part or full, according to the relative amount of acid phosphate present. In short, the phenomenon in question seems to be one of unstable equilibrium among certain phosphatic salts, the balance of solubility being easily disturbed by changes of temperature. These considerations tend to throw some light upon the deposition of calcium phosphate within the bladder, and upon the formation of urinary calculi, as showing how phosphatic precipitation may take place in a feebly acid condition of the urine. (Dr. Walter G. Smith, Dublin, Brit. Med. Journal, July 14, p. 68.)

RENAL CALCULI AND GRAVEL.—*Influence of Diet and Remedies on the Uric Acid Secreting Function.*—Lehmann first determined the daily excretion of the principal constituents of his urine when on an ordinary mixed diet; he then placed himself on a purely animal diet (chiefly eggs) for twelve days; afterwards, for another twelve days on a purely vegetable diet; and subsequently, for two days on a purely non-nitrogenised diet, which consisted of fat, milk, sugar, and starch. The conclusions which particularly interest us at present are that the total solids, as well as the urea, are much increased by animal food, while they are considerably decreased by a vegetable diet, and still more so by one which is non-nitrogenised; whereas the uric acid is not nearly so much affected by the nature of the food, provided that it contains nitrogen. Thus, it is seen that the urea on an animal diet, was to the uric acid 53·198: 1·478; on a vegetable diet, 22·481: 1·021; and on a mixed diet, 32·498: 1·183. Estimating the amount of uric acid, on a mixed diet, as 1, animal food brought it up to 1·27; a vegetable diet lowered it to 0·863; and a non-nitrogenised diet to 0·63. Lehmann found that after the use of purely animal food the urine of man closely resembles that of the carnivorous mammals, becoming of a light amber colour; having a strong acid reaction, and containing neither lactic nor hippuric acid. On the other hand, after a course of vegetable food, the urine becomes of a brownish-red tint, is much less acid, often deposits the earthy phosphates, and always contains alkaline lactates with oxalate of calcium—in fact, the urine closely approaches to that of the herbivorous mammals. It might be added, though Lehmann does not allude to the fact, that, under these circumstances, there is also found hippuric acid in considerable quantities. As a result of all the experiments made by different observers—both on man and the lower animals—I think we may fairly come to the conclusion that meat, taken in such quantities only as are sufficient to keep up the nutrition of the body, has no tendency to increase the excretion of uric acid; that, when the diet is purely animal, but the quantity small (as is the case with the carnivorous animals when in confinement), the uric acid, far from being large, becomes exceedingly small in amount, more especially when it is compared with the urea. On the other hand, that the taking of a great quantity of meat—an excess compared with the requirements of the system—tends to increase the uric acid, though, even then, not more than in proportion to the urea. Funke states that uric acid is less affected by food than any other ingredient of the urine; it is, however, influenced by the time of taking it: that is, uric acid is thrown out in larger quantities after a meal than during the hours that an individual is fasting. These different facts can be advantageously applied in practice in the treatment of gravel and calculus. In such cases there is certainly no reason why a proper quantity of animal food should not be taken; and the knowledge of this is important, seeing that many patients have been lowered in health by being kept on insufficient diet, with the idea that, by these means, a lessening of the excretion of uric acid would result. (Dr. Garrod, p. 208.)

Alkaline Treatment.—In the treatment of uric gravel and calculus, the different alkalies and their salts play a most important part, and it is very desirable that their special actions, as well as their relative values, should be clearly made out: this I now propose to do. I may at once bring to your recollection the fact that, if we give any fixed alkali in the state of a carbonate, it is absorbed and passes through the kidneys in an unaltered form; that is, a carbonate, when taken by the mouth, appears as such in the urine, and, therefore, necessarily diminishes the acidity of that fluid, sometimes rendering it neutral or even alkaline, according to the quantity administered; so that, if we give, at frequent intervals throughout the day, a quantity of the alkali equal to the neutralisation of about thirty grains of oxalic acid—the average acidity of the day's urine—we shall, as a rule, keep that fluid in a neutral state. All of us are probably aware that, if an alkaline citrate is given by the stomach, it is changed, either in the blood or kidneys, into the corresponding carbonate. The same is the case when an acetate or tartrate is administered; in fact, most of the vegetable salts are thus decomposed in the system, carbonates appearing in the urine. The establishment of this point is important, inasmuch as we can, by the use of these valuable salts, introduce into the system, through the mouth, salts which have no alkaline action on the stomach, and form, often, an important part of vegetable food, and can still produce the remote alkaline influence where it is wanted; in short, we can often give, even an acid salt, grateful and useful to the stomach, and yet have the very opposite effect induced upon the urine. *Lithia.*—The value of the lithia-salt over that of potash, and still more over that of soda, is most evident. Other experiments were afterwards made with solutions of different strengths. Thus, in three experiments (the solutions contained fifty grains to the twenty fluid ounces; time, twelve hours; temperature, 100° Fahr.; with frequent agitation); the carbonate of sodium solution dissolved 16·2 per cent.; the carbonate of potassium 23·1; the carbonate of lithium 37·7. In another experiment, the sixty grain lithia solution being used, but the time altered, at first to ten hours at 100° Fahr., then to eight hours at about 60° Fahr., the solvent power was 60·8 per cent.; but, when a solution containing one hundred grains to the twenty fluid ounces was employed, the solvent power was as high as 70·2 per cent. Lastly, it will be observed that when the comparison of the solvent power was made between the potash and lithia salts, using twenty and afterwards ten grains to the pint—the quantity used by Dr. Roberts in his lithia experiments—the results were in each case more than 50 per cent. in favour of the carbonate of lithium. (Dr. Garrod, p. 211.)

Influence of Hippuric and Benzoic Acids.—If the urine of man could be maintained in a condition resembling that of the herbivorous mammal, there would be no such things as uric concretions, uric gravel and calculus would be unknown. Alkaline remedies, useful though they are, do not effect all that could be desired. They do, indeed, as we have seen, hold the uric acid in solution, but in no degree do they remove it, for analysis has shown that the amount eliminated under the influence of alkalies is not at all decreased. We have thus arrived at a remarkable conclusion, for we have found not only that the horse's urine is itself free from uric acid, but that it possesses the power of destroying, at least to some extent, the uric acid contained in the urine of man. It struck me that this conclusion was one which might be fraught with weighty consequences, and deserved, or rather demanded, much further and stricter investigation to corroborate it. Such proof, you will find, is not wanting. Uric acid, in the form of calculi, when first dissolved in an alkaline solution, is destroyed by the influence of some ingredient which is present in the urine of the horse. After reflecting upon these phenomena, I endeavoured to find out what was the principle contained in these urines of the herbivora which imparted to them this peculiar power; and, seeing that they are rich in hippuric acid—a substance absent from the urine of the carnivora—I instituted a very numerous set of experiments upon the action of this acid on uric acid. In these observations I have used the urates of ammonium, sodium, potassium, and lithium, and acted upon them with the hippurates of the same bases, and I have uniformly found that when hippurates and urates are together in solution a change ensues, the urate becoming gradually destroyed, and probably a part of the hippurate also. It has required, under the conditions which have been present in most of the experiments, nearly fifty times as much hippurate as urate for the complete destruction of the urate; but, when the dilution was much increased, the quantity of hippurate required seemed to be lessened, as little as twenty-five parts of hippurate being sufficient. Possibly in the animal body the action takes place more rapidly than in the flasks of the laboratory. When the urine of a herbivorous mammal contains but little hippuric acid, then uric acid is present. This is the case in the sucking-calf. When, however, the young animal ceases to take milk, and lives on a diet of grass, clover, and the like, then the urine becomes rich in hippuric acid, and the uric acid disappears, being removed by the destructive influence of the hippuric acid. Now it follows necessarily that what happens in the case of these lower animals, applies also to man. If the quantity of hippuric acid becomes increased, the uric acid becomes diminished, and we are in a position to explain an observation made by Heller, who, in conjunction with a friend, first ascertained the quantity of uric acid which each excreted daily when under an ordinary diet; they then changed the character of their food—Heller living for a week on wheaten and rye bread, his friend on rye bread only, water being the sole drink of both. The uric acid soon began to diminish and to be replaced by hippuric acid, and at the end of the week a mere trace of uric acid was found in Heller's urine—none in that of his friend. During the next week, on an ordinary diet, the hippuric acid gradually diminished and the uric acid reappeared in the former quantities. Doubtless the character of the food, in these experiments, had a direct influence on the formation as well as on the destruction of the uric acid, for the amount of the nitrogenised elements of the food must have been small. We know that glycine or glycocal (gelatine sugar), which enters into the composition of the bile of many animals, is closely connected with hippuric acid, that this latter can be broken up into benzoic acid and glycine when boiled with caustic alkali, and, in fact, benzoic acid, when absorbed from the stomach, takes up glycine and becomes converted in the system into hippuric acid, and is thus thrown out in the urine. Such being the case, I thought it most desirable to try the influence of this body upon uric acid, and to find out whether it plays any part in the change of the uric acid. I made numerous experiments, using glycine in place of hippuric acid, the other conditions remaining the same, and in no instance did I observe any change in the uric acid—even when days or weeks had elapsed. I then had to look to benzoic acid, and ascertain whether the change in the uric acid was due to its influence, and for this purpose I completed a set of observations corresponding to those previously made with hippuric acid. The results were as follows:—I found that benzoic acid, in the form of a benzoate, when in contact with an urate in an alkaline solution, caused the same slow change in the uric acid which ensued when a hippurate was employed. This change, however, cannot be well observed under the microscope because the crystallisation of the benzoic acid is so rapid that the presence of uric acid is obscured; but, when the solution is evaporated and the benzoic acid removed by alcohol, the murexide test can be readily employed. In the appendix to my recent communication to the Royal Society, I have detailed the various observations on this point, which appear to show that about the same amount of a benzoate as of a hippurate is required in order fully to effect the change in the uric acid. To us, as physicians, several questions naturally suggest themselves. Can we make any practical use of the facts before us? Will the administration of hippurates or benzoates prove of any practical value in the treatment of the different forms of diseases connected with the uric acid diathesis? Can a diet be devised which will assimilate to some extent the urine of man to that of the herbivorous mammal? These are questions of no little importance to us and to humanity at large. If hippuric and benzoic acids in an alkaline solution possess the power of changing and removing uric acid, it is natural to suppose that, when the blood is in an abnormal state from its presence, the administration of the salts of these acids should prove valuable; for there is no doubt that if hippurate of sodium be added to a blood-serum which shows the presence of an urate, the latter is soon removed from it.

Clinically, I have derived great advantage from the administration of these salts, which I have used very largely in cases of gout; and patients have asked to be allowed to continue taking them, so much did they think they were benefited by them. To us at the present time, it is important to ascertain whether they are of value in cases where uric acid is liable to be deposited in any portion of the urinary tract. This I shall endeavour to do. In the first place, these salts act advantageously on the mucous membrane of the bladder and its appendages; and, in cases where there is a disposition in the urine to become ammoniacal from decomposition, they are most useful in checking such tendency. You will, perhaps, remember that in my first lecture I said that I had found the urine of the horse much less liable to decomposition than that of man, a circumstance possibly due, in part, to its containing hippuric acid. This action on the membrane may influence much the secretion of the colloid matter, and thus prove valuable in cases of gravel and calculus, which are so intimately associated with its urine; and lastly, it may have an effect upon the excretion of uric acid—a point which I must now endeavour to ascertain. I have said that the usual absence of uric acid from the urine of the herbivorous mammal is due, not to its non-formation, in small quantities, in their kidneys, but to the presence of considerable quantities of hippuric acid in the urine; and that, provided that we remove this latter principle by an alteration in the food, assimilating it to that of the young sucking animal which takes milk only; or by giving vegetables which do not yield hippuric acid; that then uric acid appears in their urine. Ought we not, therefore, to conclude that the administration of benzoic or hippuric acid would influence the excretion of uric acid? Is this the case? In the herbivora, the urine is always alkaline in reaction; in man, it is acid. In my experiments on the destructive influence of hippuric or benzoic acid upon uric acid, I found it important to use solutions made alkaline with a carbonate, thus imitating, as nearly as possible, the condition of herbivorous urines. We do not get this in the case of man. Let us see the facts. In 1842, when, in a very limited number of experiments I gave benzoic acid in the free state, I found but little alteration in the excreted uric acid, still it was lessened. I frequently give the benzoic acid in the form of benzoate of sodium; but, if I wish at the same time to increase the quantity of the urinary excretion, then I give the benzoate of potassium or of lithium; and, if there be an abnormal acidity of the urine, some alkaline citrate. (Dr. Alfred B. Garrod, Consulting Physician to King's College Hospital, p. 214.)

Tumours and other Obscure Conditions of the Bladder.—*Diagnosis.* — The principal aids to the diagnosis of tumours within the bladder are as follows:—1. The detection in the voided urine of minute tufts which from time to time become accidentally detached from the parent growth. These tufts can be microscopically identified as branched villi, with central capillary loops covered with one or several layers of epithelium. 2. Catheterisation with the intention of entangling in the eye of the instrument fragments of the villous growth. 3. Exploring the surface of the bladder by means of a sound, in order to detect any irregularity in the surface of the vesical wall. 4. Bimanual palpatation. 5. Digital exploration of the bladder. The urine at times contains coagula, and occasionally detached fragments of the villous branches may be recognised. The latter, when detected and examined under the microscope, afford the most conclusive and satisfactory evidence of the nature of the case. In Mr. Berkeley Hill's case, published in the University College Hospital Reports for 1880, it is stated that bits of tissue, showing the nested arrangement of epithelium characteristic of epithelioma, were detected in the urine; any observation of this nature of course renders the diagnosis of epithelioma a certainty. Beyond the information afforded by an examination of the urine additional knowledge may be gained by the use of a full-sized metal catheter, provided with large eyes. The bladder should be examined when fully distended with urine, and the growth freely floating in its contents—the branches follow the flow of urine, and becoming entangled in the openings into the catheter, are torn off during the removal of the instrument. It is necessary to offer a word of caution against the indiscriminate, or rough use of catheters for diagnostic purposes in suspected cases of villous growths. In the first place, septic contagion may be introduced into the bladder and cause troublesome catarrh. Fatal hemorrhages have followed the use of the catheter in such cases. Examples are mentioned by Cruveilhier, Leudet, Tufnell, Rendu, Langlebert, and Guyon. In addition to the value of the catheter in procuring fragments of the growth for purposes of diagnoses, further knowledge may be gained by its use. A sensation is conveyed by the catheter as though the end was moving through a mass of floating hair, or in a spongy substance, or in a velvety or woolly surface. The examination of the bladder by bimanual palpation is frequently of great value as a diagnostic agent. Simon recommends in female subjects the introduction of the index finger into the previously dilated urethra and the middle finger into the vagina, whilst the other hand depresses the vertex of the bladder downwards towards the index finger, by this means a complete exploration of the bladder can be made in the majority of cases. Volkmann recommends that in male subjects, when they are under the influence of chloroform, one finger of the left hand in children and two in adults should be introduced as far as possible into the rectum, whilst an assistant presses both his hands, flat above the symphysis in the hypogastric region, forcing the bladder towards the surgeon's fingers. By this means, in lean persons, with empty bladders, and without enlarged prostate, the vertex of the bladder may be fully examined. When the surgeon detects any pathological change, he glides his right hand below those of his assistant, and by this means he transfers the morbid part of the bladder entirely between his own hands, which permits a more trustworthy opinion to be formed. Digital exploration of the bladder is the final and most certain method of arriving at the diagnosis: in the female there are no difficulties in the way, for the short and easily dilatable urethra offers but little impediment to a thorough exploration of the interior of the bladder with the forefinger. (Mr. Walter Whitehead and Dr. Bilton Pollard, p. 216.)

Urinary Tests.—*Picric Acid.*—In testing urines, it often happens that serum-albumen being detected, no further search is made for peptones. It is, however, easy to demonstrate their presence, since they strike a peculiar rosy red with Fehling's solution in the cold, absolutely distinct from the mauve coloration the same reagent gives with any form of albumen. When peptones and albumen are mixed in the same solution, then the rose colour predominates over the paler mauve. Another delicate test for their presence is the increased rapidity with which a peptonised urine will make a solution of albumen pass through a filter in a given time, as compared with a urine free from peptones. With respect to the nature of the peptones present in urine, I believe they consist chiefly of parapeptone, and that what may be called for convenience the "final" peptones, are only present in small proportion. Dr. Johnson infers that picric acid detects the modified albumen (alkali albumen) that occurs in highly alkaline urine. It undoubtedly does so, as it does with all forms and modifications of albumen; but still here the employment of additional tests, such as determining the nature of the alkaline reaction (fixed or volatile), and the reaction with heat, before and after neutralisation, will throw considerable light on the nature of the chemical changes in the urine which have brought about this modification, and thus prove of considerable service to the practitioner. Again, picric acid, I believe, precipitates mucin from urine (I have found experimentally that a solution of mucin, carefully prepared from ox-gall, gives an abundant precipitate with picric acid). Now here, again, unless a determining test is used, we are likely to fall into error, since the urine often contains a considerable quantity of mucus in solution; and, if we rely only on the picric acid test, it is possible that we may be misled into magnifying a slight vesical catarrh into renal disease. The true position of picric acid as an urinary test, I believe, is this. It is the best possible substitute for nitric acid: since it is far more delicate, and it is far more convenient and cleanly for use. Further, picric acid has this advantage: that it can be made available for the detection of sugar in urine. The very best thanks of the profession are, therefore, due to Dr. Johnson for the introduction of this valuable and convenient reagent, which will enable the practitioner, at the bedside of the patient, with ease to detect the presence of these substances in the urine: and thus, on the spot, to gain an insight into the probable nature of the case. But, in making use of this convenient reagent, he should be careful not to employ it in a routine manner. In every instance, especially in testing for albumen, he should see that a sample of urine be sent to his house, where tests for determining accurately the nature of the albumen present can be employed. Of these, *heat* is the most important clinically; since the blood-albumens—sero-albumen and paraglobulin—are alone coagulable by heat, at temperatures ranging from 72° to 76° C. (Dr. C. H. Ralfe, Brit. Med. Journal, April 7, p. 661.)

Dr. Oliver's Urinary Test Papers.—The advantages of having, in a readily available form, a test for the detection of albumen or sugar in the urine, are obvious. We have received from Messrs. Wilson and Son, of Harrogate, specimens of urinary test-papers which promise to be of real practical value. These papers are of various kinds, some simple, and others compound; but our observations have been confined to the indigo-carmine papers for the detection of sugar, and to the potassio-mercuric iodide papers for albumen. The sugar-test depends on the well-known property of indigo-carmine being converted into indigo-white in the presence of certain organic matters. This reaction has long been known in the arts, and has received practical application in certain operations connected with the dyeing of calicoes. The chemical change that takes place is this: indigotine, the colouring matter extracted from commercial indigo, when brought in contact with oxidisable animal matter in the presence of alkalies, takes up hydrogen, and is converted into indigo-white, which, in its turn, under the influence of oxygen, is capable of reconversion into indigotine. Dr. Oliver has utilised his knowledge of this fact in a very clever way. He has saturated filtering-paper with a solution of carmine of indigo—sulpho-indigotate of sodium—a substance which, on being heated with carbonate of soda in a solution of glucose or saccharine urine, becomes first green, then red, and finally yellow. The paper is cut into slips about an inch in length and a quarter of an inch in breadth, and these are put up in little boxes with corresponding slips saturated with carbonate of soda. The practical application of the test is very simple. One of the indigo-carmine and one of the carbonate of soda papers are dropped into a test-tube and covered with water. A drop of the suspected urine is then added, and the whole is boiled up together over the flame of a candle or spirit-lamp. The colour of the indigo-carmine is dissolved out of the paper; and then, if sugar be present, the solution becomes first green, then red, and finally yellow or colourless. On allowing the urine to cool, it absorbs oxygen, and the colour is gradually restored. We have tried the test with different urines, and believe it to be in the main reliable, although many organic substances besides sugar seem to act in a similar way. The indigo-reaction is given by every form of carbo-hydrate; whilst the copper-test, as is well-known, is not reduced by all forms of sugar. This in some cases will be an advantage, whilst in others it will be found disadvantageous. The test for albumen is, if possible, still more simple. A little of the suspected urine is poured into a test-tube, and a potassio-mercuric iodide and a citric acid paper are added, when, if albumen be present, a white precipitate almost immediately falls to the bottom of the tube. This test is undoubtedly very delicate, and in one case we obtained the reaction when cold nitric acid gave no precipitate until some minutes later. (Editor of Brit. Med. Journal, Sept. 29, p. 633.)

VARICOCELE.—*Subcutaneous Injection of Liquor Ferri Perchloridi.*—In a case under my care it just occurred to me that I had read an extract from the pen of Dr. William Colles, in which he recommended the subcutaneous injection of the liquor ferri perchloridi as a radical cure for piles. It struck me at once that this was the remedy for the radical cure of varicocele. I took the initiative on the moment, and suggested the operation to my patient, who consented to it. I found there were two large bunches of varicose veins, one in front of the epididymis, and the other higher up in the spermatic cord. I selected the latter situation, and injected ten minims of liquor ferri perchloridi with a subcutaneous needle, placing half a sliced potato between the spermatic cord and the groin to protect the needle and steady the cord. I then plunged the needle, previously charged, through the bunch of varicose veins into the sliced potato, and then, withdrawing the point of the needle into the centre of the varicose veins, I injected the contents of the syringe. Immediate effusion took place into the areolar tissue, which became quite tense and very painful, so much so as to cause syncope, and he was not able to leave my office for home for some considerable time; nevertheless he was able to resume his usual occupation the following day, and the ultimate result was a radical cure of his varicocele. I have seen him repeatedly since the operation, and there is no symptom of a return of the disease; the testicle has assumed its normal condition and solidity; there remains a hard cord from the agglutinated veins, which appear to be quite obliterated. Were I to perform the operation again with the liquor ferri perchloridi I should first place the patient under the full power of chloroform, injecting subcutaneously at the same time the solution of morphia, so as to keep him under its influence for some time after the operation. Some time after this I had two other cases of varicocele, and in these I used an injection subcutaneously of strong tincture of iodine with the same good results, and the pain caused was trifling compared with that caused by the solution of iron. These two patients were able to resume their different occupations the following day, simply using a suspensory bandage as a protection. I should have mentioned, that the subcutaneous injection of the tincture of iodine produced considerable effusion into the spermatic cord and areolar tissue likewise. (Mr. Richard L. Pinching, San Francisco, p. 321.)

AMPUTATIONS, FRACTURES, DISLOCATIONS, AND DISEASES OF THE BONES, JOINTS, &c.

Antiseptic Dressings.—*Iodoform.*—The use of iodoform in operative surgery is comparatively recent, and at present is by no means general, as many surgeons are deterred from using it by the supposed risks of iodoform poisoning. Ordinary antiseptic dressings are, as is well known, inapplicable in operations near any of the natural orifices of the body, and also in the operation of colotomy and others of a like nature. In these cases iodoform may be used either in powder or mixed with glycerine in the proportion of one part to eight. In a patient on whom I recently opened the colon in the left lumbar region this use of the drug was found of great service. In another case, after tying a large mass of hemorrhoids, I found that separation was delayed beyond the usual time;

but the putridity which usually occurs under these circumstances was entirely prevented by painting with the mixture of iodoform and glycerine mentioned above. Iodoform may be used as an adjunct to other antiseptic dressings in two ways—either to purify the skin, or to increase the antiseptic power of the dressing employed. The importance of having the skin surgically clean cannot be too strongly insisted upon, the presence of organisms on the skin being one of the most frequent sources of wound infection. This has been particularly insisted on by Dr. Ogston, who has shown that micrococci are found in great numbers in the ducts of the sweat-glands, and that dangerous consequences may supervene owing to micrococcus infection. With the object of reducing this risk to a minimum I have lately used a thin iodoform ointment or pomade, using it as an inunction to all parts in the neighbourhood of the wound. By adding tragacanth powder to glycerine, in the proportion of twenty or thirty grains to the ounce, a convenient basis is obtained, to which iodoform can be added in any desired proportion ; a drachm to the ounce seems to answer every purpose. With the object of increasing the power of the dressing employed, iodoform may be used freely external to the wound. The dressing is applied in the following manner :—The operation having been completed with the usual antiseptic precautions, a strip of gauze is dipped in carbolised water and sprinkled thickly with iodoform ; this is applied to the edge of the wound over the sutures. A handful of salicylic silk is then taken, and about a teaspoonful of iodoform is poured upon it ; this is placed over the end of the drainage-tube. If it is probable that the discharge will be large in amount, the skin is powdered with iodoform. A pepper-box may be conveniently used for this purpose, and silk freely used wherever it is expected that discharge will collect. A pad made of silk placed between gauze, and large enough to overlap the wound for eighteen inches in every direction, is then fixed to the part with gauze bandages ; the edges are secured with elastic webbing or with strapping. A first dressing applied in this manner need not usually be disturbed for from five to eight days, and subsequent dressings may be left even longer. This mode of treating wounds is in practice found to answer admirably, and this is what we would expect on theoretic grounds, for it fulfils two conditions of primary importance. (Mr. A. F. M'Gill, p. 231.)

Dr. Mikulicz has recently published in the Berliner Klin. Wochenschrift a paper in which he discusses the uses of iodoform in surgery, and sums up as follows :—1. Iodoform is an excellent remedy in all conditions in which the direct application of an antiseptic to a wound is required, and in this matter deserves to be preferred to all other means at present in use. 2. Lister's carbolic gauze dressing may be completely replaced by iodoform dressing, which has the additional advantage of being simple and certain. 3. Iodoform dressing ensures an aseptic course to wounds, even in conditions where it has not hitherto been possible to carry out antiseptics strictly. 4. In cases of wounds and ulcers which have already become septic, iodoform acts, as a rule, more rapidly and certainly than other antiseptics, and does not irritate the tissues. 5. Iodoform acts as a specific on syphilitic, tuberculous, scrofulous, and lupous infiltrations. Dr. Zeissl relates in the Allgem. Wiener Med. Zeitung two cases in which toxic symptoms—erythema, fever, and albumen and iodine in the urine in one case, urticaria and iodine in the urine in the other—followed the application of iodoform after operation. The quantity used, however, is not stated. (Dr. Mikulicz, Dr. Zeissl, Edinburgh Medical Journal, June, p. 1127.)

Carbolized Sawdust.—One of the drawbacks of the usual antiseptic dressing is the rapidity with which the discharges come through on the first day or two after operation, often necessitating the re-dressing of the case within a few hours. To prevent this, and yet not to interfere with the aseptic condition of the wound, is a distinct advantage both to the patient and the surgeon. The material I have used recently in a considerable number of cases is coarse sawdust, soaked in (1 in 10) solution of absolute phenol and spirit of wine, then allowed to dry slightly so that the spirit may evaporate, leaving the sawdust charged with carbolic acid. When used it is enclosed in a bag made of several layers of gauze, and applied outside the deep dressing, the usual external dressing being put over it. The sawdust thus takes the place of the padding of loose gauze which is generally used. Its absorbent power is very great, and it has the additional advantage of keeping up an equable pressure on the divided tissues. I find that fourteen ounces of sawdust will readily absorb about one pint of fluid. (Mr. H. P. Symonds, Oxford, Lancet, Sept. 22, p. 424.)

Absorbent Cotton-Wool Tissue.—Messrs. Robinson & Son, of Wheatbridge Mills, Chesterfield, have, at the suggestion of Mr. Sampson Gamgee, made a material for surgical dressings, to which the name of absorbent cotton-wool tissue has been given. It consists of very fine and pure absorbent cotton between two layers of fine absorbent gauze. It is sold in rolls of various widths, like lint, or cut into sheets of different sizes. This tissue is very light, perfectly smooth, powerfully absorbent, and of great elasticity. It can be applied to any surface with the greatest ease, and has very many uses in surgery. Thus, as a means of applying elastic compression, there is nothing more convenient than a bandage evenly applied to a limb or the trunk over a layer of this tissue; it makes an excellent absorbent dressing for wounds, and is a padding for splints which can at once be applied quite evenly. Mr. Gamgee has also shown that it can be utilised for the application of plaster-of-Paris splints. For example, to apply such a splint to the leg, all that is needed is to wrap the limb in a layer of the dry tissue, then take a similar piece of the tissue and soak it in plaster-of-Paris "cream," and fasten it to the limb by a light bandage; extra strength can be obtained either by another layer of the soaked tissue, or, much better, by laying thin narrow slips of deal veneer between the layers of the tissue. In this way a plaster splint is very readily applied, made to fit accurately to the part, and yet be of the minimum weight. The tissue is sold also by Messrs. Southall and Barclay, impregnated with any of the various antiseptic agents. We anticipate that this tissue will become a very favourite dressing material when its many great advantages come to be generally known. (Lancet, June 9, p. 1003.)

Congenital Club Foot.—In the ordinary course of dealing with an infant's foot in which the heel was firmly elevated and the sole faced directly inwards one or more of the tibial tendons would be divided, and after the lapse of a few days the foot would be secured in a Scarpa's shoe, for the correction of the inversion. When this first step in the operation had been accomplished the second would be taken, which consisted in the section of the tendon of Achilles; and when the slight wound in the skin had become securely mended the heel would be gradually brought down by means of the working of a cogwheel at the ankle. Subsequently through weeks or months precautions had to be taken to provide against a relapse. Those who have had much to do with Scarpa's shoes will probably agree in this, that, excellent as they are, they are costly; that in hospital practice at least they are apt to get out of repair; that the little patient has a marvellous knack of getting his small heel from out of the depths of the shoe; that the infant requires almost daily surgical supervision; and that even when the greatest care is being exercised, the localized pressure of a strap is apt to excite general irritability or distress, and to excoriate the foot. Now, by substituting a properly prepared plaster-of-Paris bandage for the mechanical shoe in many cases the tendon of

Achilles only need require division; and about three or four days after the little operation the foot is to be put in a thickish sock which fits it evenly and smoothly. Then from about the line of the clefts of the toes to a few inches above the ankle, the foot is to be quickly and firmly encased in the web plaster bandage, and immediately that the last turn is finished the foot is to be forcibly manipulated, so that as the plaster is setting it may be steadily held in a position towards flexion and eversion such as shall give cheering and definite promise of eventual cure. In three minutes or less, when the plaster has hardened, the tip of the sock should be cut off in order that the toes may be exposed to view, for if they by chance were seen swollen or congested the hardened bandage would at once be removed; but if not the casing might be left on for two or three weeks without being touched. At the end of that time it should be removed by finding the end of and unwinding the bandage. The foot should then be rubbed with oil and again enclosed as before, only as the plaster is hardening this time the position is to be absolutely rectified. In another three or four weeks the foot may be again examined, and then put up a third time in plaster-of-Paris, or fitted with a stiff leather boot, as may be deemed expedient; when the patient lives at a distance the former course is desirable, lest the needful frictions and manipulations being but imperfectly executed a relapse follow. (Mr. Edmund Owen, p. 263.)

DISLOCATION OF THE ELBOW-JOINT.—The operator sits on the corner of a table, at the end of which the patient is placed upon a chair (see Fig. 1, p. 245). The injured limb is drawn under the surgeon's proximal thigh, which rests, close to the joint, on the anterior surface of the humerus, while the olecranon is accurately placed on the anterior surface of the lower third of the distal femur, and the proximal foot is "hitched" behind the other leg, which is flexed firmly against the frame of the table. In order to obtain the most favourable fulcrum, the surgeon fixes his proximal elbow against the antero-internal aspect of his corresponding thigh (this is not correctly shown in Figs. 1 and 2), and, grasping the wrist of the patient with both his hands, reduction is effected by the simultaneous and co-operative action of the muscles of the arms, back and thighs. Fixation and counter-extension are supplied by the powerful thighs of the operator, and coaptation is effected, with great nicety, by the backward pressure of the proximal femur against the anterior surface of the humerus, while the distal femur forces the olecranon forwards. Owing to the accuracy with which it can be applied, this power, which is incalculably greater than that afforded by the pressure of the finger and thumbs (Boyer), is sufficient, when the forearm is steadied, to reduce an ordinary dislocation without the aid of extension. Additional adjusting influence is exercised by the inner side of the proximal thigh, which by pressing against the anterior surface of the forearm, liberates the coronoid process from its position behind the lower extremity of the humerus, and allows the greater sigmoid cavity to resume its normal relation to the trochlea. Extension is supplied by the muscles of the upper extremities acting round the fixed point provided by the elbow of the surgeon, and when his body is thrown backwards, additional force is derived from the muscles of the back, the glutæi, and the other extensors of the thighs. This power may be applied at various angles in rapid and easy succession, an advantage which the surgeon experienced in the treatment of dislocations cannot fail to appreciate. (Mr. James E. Kelly, p. 244.)

Dislocations of the Thumb.—The following manœuvre, which was first employed more than ten years ago, consists of the addition of circumduction to a methodised combination of recognised expedients, namely—(1) increasing the deformity by bending the phalanges backwards; (2) pressing on the projecting ends of the bones; (3) applying a rocking or zigzag motion to the phalanges; (4) rotating them inwards; (5) flexing them towards the palmar surface, and, if necessary, (6) the application of extension. It is well to realise that reduction is effected by constraining the projecting extremity of the metacarpal bone, to retrace its course through the "button-hole" opening, and to resume its position within the deep articular fossa. Reflecting on the term "button-hole," which is so generally applied to this aperture, it is interesting to observe the resemblance which this expedient bears to the unbuttoning of a coat, by drawing the most convenient margin of the yielding button-hole round the projecting portion of the rigid button. The head of the bone corresponds with the button, and the slit to the yielding material—the most convenient and freest margin being the outer, the inner being generally fixed, by the persistent lateral ligament, to the internal side of the metacarpal head—which is also the narrower, a circumstance of which advantage is taken. The operator, grasping the thumb and attending particularly to the immobility of the metacarpal bone, having fixed the injured member in the flexed position, (1) presses his own thumb against the displaced phalanx, and bends the patient's backwards almost to a right angle, with a slight inclination inwards; the base of the phalanx is then moved along the internal margin of the posterior surface of the metacarpal bone, with a rocking motion until it reaches the inner edge of the articular surface, closely followed by the thumb of the operator, to prevent retraction and to aid by impulsion; when (2) adducting suddenly the base with a slight movement of its narrow inner margin upwards, to "hitch" it behind the internal lateral ligament, and rotating it inward, with the pressure applied chiefly to its external condyle, to impel it obliquely from above, forwards and inwards over the articular surface, and to force the outer boundary of the "button-hole" over the metacarpal head, while (3), extending the wrist, the operator gradually flexes the phalanx and sweeps the middle part of its base along the anterior articular margin until it reaches, in full flexion and abduction, the prominence for the external sesamoid bone; when (4) the phalanges are extended in a straight line with the metacarpal bone. Should additional extension be required, an assistant can supply it in the most favourable manner, without interfering with the manipulation, by throwing a loop of strong tape round the posterior surface of the phalanx while it is in the angular position, and drawing it towards the inner edge of the metacarpal surface. The wrist is flexed during the first stage to relax the anterior muscles, the extensors being already relaxed by the position of the base of the phalanx, and, extended during the second stage to permit of free circumduction, by relaxing the extensors, and because the tension thus produced by the short muscles is at this stage favourable to the traction forward of the base of the phalanx, and to the liberation of the anterior articular wall. The phalanx is brought to a right angle, and circumducted on the internal lateral ligament to displace, if necessary, the tendon of the long flexor and to induce the upper detached margin of the anterior ligament to pass from its position, between the bones, over the narrow inner edge of the metacarpal head, and it is swept round the anterior margin as far as the prominent external condyloid eminence to complete this transposition, and extended at this point that the projection may hook forward the ligament and allow the head to resume its position within the deep articular fossa. It is well to observe that in the second and third stages two movements of circumduction are employed which coincide at a point posterior to the internal lateral ligament, the first passing inwards and upwards, with a sharp curve, and the second inwards, downwards, forwards, and outwards. They are represented by the diagram, (see Fig. 1, page 251) which indicates the curves for the left thumb. (Mr. James E. Kelly, Dublin, p. 247.)

FRACTURES.—*Immediate Treatment by Plaster-of-Paris Bandages.* —My object is to induce surgeons to have more faith in the early treatment of fractures by plaster-of-Paris than appears as yet at all general, and thus to save their patients and themselves an infinity of trouble. Let me take, as a good example of the treatment, an ordinary case of fractured patella. Every one knows that the joint soon fills up with blood and synovia, which take many days for their absorption; but every one apparently does not know that, if the case be seen before effusion has occurred, it may be entirely prevented by wrapping the knee-joint up in cotton-wadding, and applying a plaster-of-Paris bandage firmly over all. I have treated many cases in this way with only a couple of days' confinement, and believe that I have in some got osseous union between the fragments, so firmly are they knit together. But, if effusion have already taken place, it is easy to get rid of it, if coagulation of the blood have not already occurred, by the use of the aspirator; and, the wadding and plaster being at once applied, no further effusion takes place, and the patient begins to walk about with a stiff knee as soon as the plaster is dry. Unless a fractured tibia be very much comminuted and bruised, I look upon plaster-of-Paris, applied as soon as possible, as the ordinary treatment to be adopted; and certainly, in Pott's fracture of the fibula, with or without fracture of the internal malleolus, nothing is so comfortable to the patient, or of so little trouble to the surgeon, as a boot of plaster properly applied, with the foot carefully held at a right angle to the leg. In the fractured thighs of children, I believe better results can be got by the immediate application of plaster-of-Paris over cotton-wadding than by any other method—even than by Hamilton's double thigh-splint with cross-bar, which is very convenient. And here let me venture to controvert a part of one of Dr. Cowling's aphorisms and the routine teaching of most surgical works, viz., that the joints above and below a fractured bone should be included in any apparatus and kept quiet so long as the fracture is under treatment. If a fracture be close to a joint, and *a fortiori* if it involve the articulation, then of course its fixation is essential; but why, with a fracture in the middle of a long bone, we should insist upon crippling a patient by doing our best to give him two stiff joints, I fail to see. With imperfectly fitting splints, it may no doubt be desirable to fix approximately the neighbouring articulations in order to obviate movements which would disarrange the fracture; but how incomplete the fixation is, anyone may see who will watch a case of fractured thigh treated with the long splint. To enclose joints unnecessarily with plaster-of-Paris, is to provide cases for the "bone-setter;" and I should never include the knee or hip-joints in any ordinary case of fractured shaft of the tibia or femur. Many surgeons have exaggerated ideas of the tendency of muscles to produce displacement. They have some tendency to contract spasmodically immediately after an accident; but this soon passes off, particularly when they are firmly and equally compressed. The apparatus for the treatment of fractured clavicle are too numerous to mention, and perhaps the simplest and best is Sayre's method with three strips of plaster. But I will venture to say that better results will be got by encasing the patient, with his ordinary jersey on, thoroughly in a plaster-of-Paris bandage, than by any other method. The clavicle being a short bone, it is of course necessary to fix the shoulder-joint by encasing the humerus and fixing it to the side; but it is quite unnecessary to fix the elbow-joint, which should be left exposed, the fore-arm being carried in a sling and used with moderation. Fractures of the neck of the humerus may be similarly treated, if the axilla be thoroughly padded with cotton-wadding, and without a shoulder-cap, which latter is always cumbersome and very apt to gall the patient. Fractures of the shaft of the humerus may be treated with plaster from the first, alone or combined with three splints; but fractures low down, and separation of the lower epiphysis in young children, I find best treated by thoroughly flexing the fore-arm upon the chest and maintaining it there with ordinary bandaging. Fractures of the fore-arm are the only ones which seem to me unsuited for treatment with plaster-of-Paris, and for the obvious reason that there would be great danger of drawing the two bones together. Two simple splints, not too wide, should be applied while the fore-arm is supinated, and then brought by the surgeon into the position between supination and pronation: these answer every purpose, while for Colles' fracture Carr's splint is the best. In fracture of the olecranon, I am heterodox enough to flex the arm to a right angle and let the patient wear it in a sling, and the result is as satisfactory as if a front straight splint were applied for a month. (Mr. Christopher Heath, Brit. Med. Journal, Sept. 22, p. 559.)

Immediate Treatment of Fractures by Plaster-of-Paris Splints.—I take this opportunity of again advocating the immediate setting of fractures, and their treatment by such splints as these. The chief obstacles to their use seem to be the lingering old prejudice in favour of waiting until swelling has subsided before finally setting the fracture, and covering up the seat of fracture with bandages. A second obstacle is unwillingness on the part of the surgeon to put it out of his power to see, touch, and tell of the changes taking place in the external appearances of the injured spot. Another obstacle is in obtaining and manipulating plaster-of-Paris. The apparatus consists of: firstly, inside and outside splints made of common house-flannel and plaster-of-Paris; and, secondly, of muslin bandages. The splints for fractures below the knee are shaped somewhat like the old short outside splint; the footpiece is, however, wider. The splint for the inside of the leg is similar in length and width to that for the outside. The splints should be long enough to extend from above the knee to the middle of the metatarsus, and together they should be in width about one inch less than the circumference of the limb at the corresponding part. A rough guide to the shape of the splint may be found in the injured person's stocking when it is laid flat on a table. Each splint is constructed of two layers of the flannel; the outer layer carries the gypsum; the inner layer forms a dry, warm, elastic lining, and protects the skin. These splints are applied by means of the muslin bandages. The bandage is put on like any other, from the toes to the knee; one thickness is enough. Two bandages of five or six yards in length are more convenient than one of ten or twelve yards. *To make the Splints.*—1. A piece of house-flannel, or an old shrunk blanket, or any suitable substitute, is selected. The pieces may be shaped by measurement, taking the circumference of the limb above and below the knee, at the biggest part of the calf just above the ankle-joint, from the front of the ankle-joint round the heel to the front again, and at the middle of the metatarsus. The flannel of each splint should be in width half an inch less than half the circumference at any of those points. The width of the two splints should be one inch less than the circumference of the limb at any corresponding part; it should be long enough to extend from above the knee to the middle of the metatarsus. Four pieces are required—two for each splint. 2. Two bandages of common muslin are prepared, each five to six yards long, and two inches and a half in width. 3. A handful or two of good dry plaster is mixed with water to the consistence of thin cream. 4. The inside pieces of flannel may be laid on the table or bed, the outer surface being upwards. 5. The outside pieces are to be soaked in the plaster separately, and laid out on their respective inside pieces. *Application.*—Whilst traction is kept up, and the ends of the broken bones are maintained in apposition, the splints are to be applied and smoothed; then the bandage is to be put on. Traction is to be maintained during the hardening of the plaster. The latter takes place in about three minutes. Next the limb should be laid on a large soft pillow, the toes directed upwards, and the knee a little bent. In the application of the bandage, great caution should be observed that it is not drawn tightly anywhere, and that no one turn of the bandage is tighter than another. The support is to be equal everywhere. The two splints should not meet by about half an inch either down the front or back. The intervals are spanned by the dry porous muslin: at the sides the bandage is fixed to the splints by the plaster, which oozes into it from the outer layer of flannel. If it become necessary next day, or later, to ease the splints, or to inspect the limb at any spot, the bandage can be slit up with scissors along the middle line in front. One or both of the splints can then be eased from the limb, and readjusted by the addition of another bandage. It is undesirable to wholly remove the splints. They are hinged together at the back by the muslin bandage which spans the interval there. The trimming of the apparatus may be done as soon as the plaster shall have hardened. Should the surgeon be short-handed with regard to assistance, he may apply the outside splint first, and lightly bandage that on; and, when that splint has nearly hardened, he may put on the inside one. As swelling subsides, and the splints become more or less loose, an additional bandage should be put on. At the end of ten days, if the patient be convalescing, the outside bandage may be gummed, or a fresh gummed bandage rolled on. That apparatus will last until splints are no longer needed. Mr. Battle, the registrar of St. Thomas's Hospital, has kindly ascertained for me that, during 1881 and 1882, 403 fractures were treated in this way, and none but good results ensued. No instances of gangrene, or bad or delayed union, or splint sores occurred. This number, with that already reported, viz., 498, makes up a total of 901 cases treated with the best results. (Mr. John Croft, British Med. Journal, Sept. 22, p. 560.)

HIP-JOINT AMPUTATIONS.—*Method of Controlling Hemorrhage.*—The method I am about to describe contains no new principle; it is an adaptation of the well-known plan of circular elastic constriction which we owe to Professor Esmarch. The limb about to be operated upon should first be emptied of blood by elevation. This will occupy only a few minutes, and may be executed during the administration of the anæsthetic. Elevation combined with gentle friction towards the trunk renders parts as exsanguineous as the at times undesirable Esmarch's roller. A strip of black indiarubber bandage about two yards long is to be doubled and passed between the thighs, its centre lying between the tuber ischii of the side to be operated on and the anus. A common calico thigh roller must next be laid lengthways over the external iliac artery. The ends of the rubber are now to be firmly and steadily drawn in a direction upwards and outwards, one in front and one behind, to a point above the centre of the iliac crest of the same side. They must be pulled tight enough to check pulsation in the femoral artery. The front part of the band passing across the compress occludes the external iliac and runs parallel to and above Poupart's ligament. The back half of the band runs across the great sacro sciatic notch, and, by compressing the vessels passing through it, prevents bleeding from the branches of the internal iliac artery. The ends of the bandage thus tightened must be held by the hand of an assistant placed just above the centre of the iliac crest, the back of the hand being against the surface of the patient's body. It is a good plan to pass the elastic over a slip of wood held in the palm of the hand, so as to diminish the pain attending the prolonged pressure of the rubber bandage. In this way an elastic tourniquet is made to encircle one of the innominate bones; checking the whole blood-supply, to the lower extremity. The elastic bandage may be secured above the iliac crest in the usual manner with tapes, and may be prevented from slipping downwards by being held with a common roller tied securely over the opposite shoulder. Experience has shown, however, that no mechanical means answer so well as the hand of a trusty assistant. When the band is once properly adjusted, the assistant has only to take care that it does not slip away from the compress or over the tuber ischii. The former is prevented by securing pad and tourniquet together with a stout safety pin; and the latter by keeping the securing hand well above the iliac crest, o even more safely by looping a tape beneath the elastic nea the tuber ischii, passing behind it under the sacrum an having it held in that position. The solid rubber tourniquet may be used instead of this bandage. I prefer, however the bandage. The soft parts are less damaged by reason o its greater breadth and it is less likely to roll off the compres placed over the external iliac. The ligature being altogethe above the limb, is out of the way of the surgeon in an operation at or about the hip joint. The great trochanter i fully exposed; the hip being free upwards as far as the ilia crest and inwards to the perineum. The plan is equally ap plicable in amputation by transfixion or in excision of th joint, as in the case above alluded to. All previous operator have controlled the blood flow during hip amputations by a apparatus adapted in some manner to the abdomen, excep in the case of the ingenious rectal lever recently introduce to the profession by Davy. Esmarch himself says in hi

Surgeon's Handbook "aortic pressure must be employed for disarticulation and excision of the hip." (Mr. Jordan Lloyd, p. 233.)

Readily-made Fixed Dressing.—Ordinary sand-paper affords a material which Dr. Levis has successfully resorted to in an emergency. The sand-paper is dipped into warm water, to soften the paper and glue, and it is then applied and retained with a bandage. The glue of the sand-paper soon gives rigidity; body and firmness are produced by the sand and paper. Strong fixed dressings, it should be remembered, can be readily prepared with the familiar domestic commodities of starch, or with the combination of eggs and flour. (Dr. Levis, Dublin Journal of Med. Science, Oct., p. 277.)

Spina Bifida.—I punctured the tumour with a No. 3 trocar low down upon one side, drew off two ounces of clear, straw-coloured fluid until the tumour was diminished to half its original size, and injected forty minims of Dr. Morton's iodo-glycerine fluid, and closed the opening with collodion and plaster. The constitutional disturbance was severe for twenty four hours, after which the tumour began to cicatrise, and gradually shrivelled up and became like a piece of rough puckered leather. The operation was performed upon the 5th of September, 1877, and in twenty-five days the tumour consisted only of rough thickened skin, which was slightly protuberant from the surrounding surface. A part of the wall of the sac the size of a shilling remained there, and apparently unaffected by the injection. This could doubtless have been destroyed by a second injection, but the mother refused to allow another operation because her child had seemed to suffer so much from the first one. Externally the remains of the tumour appeared as thickened and puckered skin, and resistant to the touch. At the centre was situated a small patch, less than the size of a shilling, of thinner skin, beneath which could be felt a small cavity. Upon dissection the remnant of the tumour was found to consist of very dense fibrous cicatricial tissue, in the form of fibres and bands passing in all directions, and closely united together. The deficiency in the wall of the spinal canal was blocked up by this cicatricial material, but with difficulty a very small probe could be passed along a tortuous passage leading from the small cavity, already referred to, to the canal. There can be no doubt that a second injection would have completely obliterated this small cavity and its connexion with the canal, and have rendered the tumour more thoroughly solid. (Mr. Noble Smith, p. 269.)

AFFECTIONS OF THE SKIN, ETC.

Acne.—*Use of Sulphur.*—Sulphur, as a local application in the treatment of acne has survived the deluge of new remedies; and although at times pushed momentarily to the background, it stands to-day the most reliable therapeutical agent for this affection. It has been employed in all of its various chemical preparations, and is so used at the present time. All are useful, and each has its advocates. Experience in their use, however, soon narrows the choice to a limited few. The most trustworthy of the preparations are the simple sulphur, either as the washed sulphur, precipitated sulphur, or flowers of sulphur, and sulphuret of potassium. There is very little difference in the varieties, so to speak, of plain sulphur, although preference is usually given to the precipitated. These two preparations, sulphur and the sulphuret of potassium, are not only the most valuable in their therapeutical effects, but also the cheapest—a small matter, it is true, yet of some importance. The plain sulphur may be used in various ways. In mild cases it may be employed simply as a toilet powder, and so used is frequently of advantage. As such, it should be dusted on the face at night by means of a powder brush and allowed to remain undisturbed until morning. The plan is easy to carry out, and for that reason commends itself. It is, as a rule, less efficient than lotions or ointments, inasmuch as it is less intimately brought in contact with the skin. In the form of a lotion sulphur is often of great service. No better formula can be given than that containing a small amount of glycerine—ten minims to the ounce—and equal parts of alcohol and rose water. A combination, suggested by Dr. Bulkley, of a drachm of washed sulphur, a half fluid ounce of ether, and three and a half fluid ounces of alcohol makes an excellent application, and is especially indicated in those cases in which comedones are predominant, or in which there is a moderate degree of seborrhœa present. Kummerfield's lotion is another very useful combination: ℞. Sulph. præcip., ʒ iv; pulv. camphoræ, gr. x; pulv. tragacanth., gr. xx; aquæ calcis, aquæ rosæ, āā f. ℥ij. M.—The proportion of sulphur in lotions should depend upon the effect produced, or to be produced; ten grains to a drachm or more to the ounce. A scruple to the ounce is a proportion most commonly used. Sulphur in ointment is another method in which this remedy may be advantageously employed. In the strength of one drachm to the ounce it is a very useful application. The percentage of sulphur in ointments is usually greater than in lotions, varying from twenty grains to the ounce up to equal parts. The sulphuret of potassium, the other sulphur preparation which stands high in the treatment of acne, is, I think, superior to the simple sulphur, although it is not in such general use. This may be due to the fact that sulphur itself has always been used and considered "good for skin diseases," while the employment of the sulphuret of potassium is more recent and the knowledge of its application less wide-spread. The sulphuretted odour of the drug is a disadvantage, but it admits of correction if desired; besides, even in its undisguised condition, the odour is merely concomitant with the application, as a few minutes afterwards it is scarcely noticeable. It may be employed either as a lotion or as an ointment. The strength varies from five grains up to a half drachm to the ounce. The proportion which is most generally required is about fifteen grains to the ounce. The lotion may consist of a simple watery solution, or small quantities of alcohol and glycerine may be added at times with advantage; the former a half drachm to the ounce, and the latter about ten minims to the ounce. The efficacy of such a lotion is in some instances increased by adding to it sulphate of zinc in the same proportion as the sulphuret of potassium. An ointment may be ordered instead of a lotion, and is, occasionally, of greater service. The lotion, however, is less tenacious of its odour, and, on the whole, is probably more efficacious. In the use of sulphur itself, preference is generally given to the ointment method; the sulphuret of potassium, on the contrary, is usually prescribed as a wash. In neither case is there any substantial reason for this, and it seems due merely to force of example or habit. It is a fact worth remembering that in some instances lotions prove of value where ointments had failed to benefit; the converse of this also holds true. Moreover, in some cases, sulphur itself may produce but little improvement, whereas marked advantage is found to follow a change to sulphuret of potassium, and *vice versâ*. The applications are best made at bed-time, as they are then less apt to be disturbed, and may remain on over night, and are, moreover, more comfortable and convenient for the patient. Before applying the preparation, the face should be sponged with hot water for several minutes. The ointment, then, if that is used, should be well rubbed in, and not disturbed until morning, when the face may be washed. If the lotion is employed, it should be well shaken, and rubbed on with a sponge or rag for three or four minutes, and allowed to dry and remain undisturbed until the face is washed the next morning. It is well to intermit treatment every week for a few days in order that the furfuraceous desquamation which all such preparations are apt to produce, although slight and scarcely noticeable, may disappear. In this respect the ointments are far less objectionable, as the unguent, in a measure, prevents or conceals it. The above preparations or combinations used in the manner described are, as I have repeatedly seen, productive of great benefit in cases of this disease; and conjoined with appropriate constitutional treatment, and perseveringly used, are in a fair proportion of the cases curative. (Dr. Stelwagon, Philadelphia, Dublin Journ. of Med. Science, Oct., p. 313.)

Antimony in Skin Diseases.—Antimony has been looked upon as a drug to be avoided, on account of the dangerous symptoms produced by even apparently moderate doses. But the same argument that applies to arsenic, and strychnia, and other drugs, applies with equal force to antimony—that the action depends entirely on the dose employed. Tartar emetic, or tartarated antimony, is the preparation I have used in my investigations, the largest dose being $\frac{1}{32}$ of a grain, or 7½ minims of the vinum, only half of the minimum dose of the British Pharmacopœia. I must mention that, in all cases in which the effect of the drug has been watched, little or no local treatment has been used. (Mr. Malcolm A. Morris, Brit. Med. Journal, Sept. 22, p. 572.)

Burns and Scalds, Erysipelas and other Superficial Affections,—*Carbolic Acid as a Local Anæsthetic and Mouth-Wash.*—Carbolic acid and other phenols with which it is associated are all very effective local anæsthetics, and this therapeutic relation is far too much overlooked or neglected. A paper by Dr. J. H. Bill, of the United States army, published in 1870, first drew attention strongly to this point, and every one who has handled the acid much has amply confirmed Dr. Bill's experience, and yet the matter has been but imperfectly followed up. Even its application to the pain of burns, erysipelas, and other superficial affections, though often insisted upon, is not generally adopted, and when adopted it is rarely in the best way. The writer knows from personal experience, and from extensive practice in his laboratory where burns and scalds are not unfrequent, that a solution containing from one-half to 1 per cent. applied by means of thin cloths, frequently renewed, will relieve the pain of burns within ten minutes; and the relief will be permanent if the application be continued during the twenty-four or forty-eight hours of primary irritation. Under such dressing, the burns, if superficial, will not suppurate, and if deeper, the suppuration will be greatly diminished and modified. If the solution be applied too strong, it will at first increase the pain for a very short time; but the after-effects are less favourable, as the irritation of too much of the acid increases the tendency to suppuration. A simple rule for guidance is that the renewal of the application should not cause smarting or renewal of the pain. The anæsthetic effect upon the acute suffering of burns and scalds is very remarkable. A 5 per cent. solution of the liquefied acid is a very convenient preparation to keep in readiness for making the more dilute solutions needed for burns, erysipelas, &c., and for such uses as protecting hypodermic solutions. One-twentieth of such a solution is quite sufficient to prevent the growth of micro-organisms in any preparation which needs protecting. It is simply to be added in making up the preparation to the required measure. A piece of paper moistened with a few drops of such a solution and kept in extract-pots, &c., will prevent the growth of mould. Such a solution diluted so as to be not stronger than 1 per cent., nor weaker than about one-half per cent., makes an excellent tooth and mouth wash for use in the morning. Habitually used, it in some degree checks the deposition of "tartar" on the teeth, keeps the tooth-brush sweet and clean, and there is nothing that leaves the mucous surfaces in so clean and pleasant a condition for the first meal of the day. A bottle of the 5 per cent. solution may be placed upon the washstand, and a couple of teaspoonfuls poured into the mug, diluted with four or five times as much water, stirred with the tooth-brush and then used upon the brush; the mouth being finally rinsed out with the remainder of the solution. This is a very good habit, which has been followed by the writer and many others for many years with advantage. (Dr. Squibb, Ephemeris, May; Practitioner, Oct., p. 293.)

CHILBLAINS.—Apply ungenitum iodi. It should be well rubbed in two or three times a day. I have known this ointment to cure chilblains after the failure of many other remedies. The other preparations of iodine are, I believe, useless in such cases. (Mr. R. J. Collins, London, British Med. Journal, Nov. 25, 1882, p. 1079.)

I have found that small doses of arsenical preparations have the effect of preventing chilblains in subjects constitutionally obnoxious to them if administered to them before the season arrives. (Mr. W. B. Peebles, Howth, Ibid.)

I recommend very careful strapping of the toes and foot, each toe receiving several narrow slips of strapping. Dipping the plaster in hot water is the best mode of application. The process must be skilfully performed, both to secure success and for the comfort of the patient. If properly applied, it will need repeating only about twice a week. In one very severe case, under the disadvantage of early pregnancy, the cure was rapid and permanent. No constitutional treatment is adopted. The plan is somewhat troublesome to the practitioner, but will reward his pains, other plans failing. (Mr. J. Floyd, Woolwich, Brit. Med. Journal, Dec. 23, p. 1288.)

I recommend Startin's solution of nitrate of silver in pure spirit of nitrous ether of the strength of two scruples to the ounce. One, or at most two paintings, are sufficient to cure when the skin is unbroken. When it is broken, the application is too severe, and I use a varnish of saturated solution of tannin in water, equal parts; this gives no pain, and answers well. (Dr. Spencer Thompson, Ashton, Torquay, Ibid.)

I have used, with never-failing success, the tincture of laurus communis rubbed in often, or simply painted over. (J. E. S., Ibid.)

I have frequently found the ordinary tincture of iodine very useful as an application to chilblains. I have many times applied it to chilblains on my own hands, and never found it fail in giving immediate relief. The best preventative for chilblains is to dry the hands thoroughly with a dry towel each time of washing, and to wear warm gloves when out in cold weather. (Dr. R. E. Burges, Kettering, Ibid.)

I have used for many years, with marked success, a combination of equal parts of sulphurous acid and glycerine, rubbed well in at bedtime on the approach of severe weather, as a preventive, and continued subsequently should chilblains, nevertheless, occur. Gloves should be worn, so as to insure its constant contact during the night. It is very important that the acid should be pure; and, perhaps, the employment of Herring's saturated solution of sulphurous acid gas in alcohol, in proper proportions, would achieve this. I make it a habit to fortify failing or impaired health with tonics and allied treatment in the early winter, so as to prevent as much as possible the effects of its severity. (Dr. Walter Bourne, Arcachon, Ibid.)

Apply a lotion composed as follows: ℞. Acidi hydrocyanici, *B. P.*, ʒ iv; acetatis plumbi gr. xvi; spiritus vini rect. ℥i; aquæ rosæ ℥viiss. Fiat lotio. This will allay the intolerable itching better than any other remedy. Should the chilblain be broken and not inflamed, apply resin or calamine ointment, whichever agrees best, sometimes one and sometimes the other. As the worst cases I have met with were chiefly among the ill-fed poor, I invariably order a liberal diet, but not too stimulating. The hands or feet affected should be well protected from the vicissitudes of the cold weather by warm gloves, mittens, or Shetland wool stockings. (Mr. F. Rawle, Titchfield, Ibid.)

I have been informed of an empirical remedy for unbroken chilblains, which is said to have been effectual. It is to bathe the chilblains every night for a few nights in meat brine. It is worth a trial. (Rusticus, Ibid.)

I can confirm the efficacy of the "empirical" remedy for unbroken chilblains mentioned by "Rusticus." When a boy, I suffered much every winter from those plagues on the feet and hands, the former more especially. I was told by an old rustic woman her cure, viz., for three consecutive nights to soak the feet (or hands) in a strong solution of rough salt in water, as hot as bearable, for half an hour, before a fire; the temperature being kept up to that just bearable from a kettle. I recommend a double handful of salt in a foot-bath. There must be no broken skin. Since I have used this remedy, I never have had a chilblain, although greatly exposed to the usual producing causes. I have recommended this treatment to many, and have never known it to fail if thoroughly carried out. (Medicus, Ibid.)

I have never known an unbroken chilblain, however bad, that did not yield with a good grace, and disappear after a few days to treatment as follows. The patient sitting before the fire, just before retiring to rest, bares the foot, and having dabbed on the chilblain a good lump of ordinary made mustard, proceeds to rub it in till the part is quite dry and warm. This process, continued every night and morning, if desired, speedily effects a cure. (Dr. Wallace, Colchester, Ibid.)

I have found the following application very useful for chilblains. ℞. Linimenti aconiti ʒ ij; linimenti belladon. ʒ ij; acidi. hydrocyan. dil. ♏ xxx; collodion ad ℥ ij. To be applied with a brush or feather night and morning, taking care that it is allowed to become well dried before exposure to cold. (D. H. P., Ibid.)

CORNS.—*Salicylic Acid.*—Dr. Traill Green speaks highly of the results obtained in the treatment of hard and soft corns with salicylic acid. He has adopted a formula recommended by Mr. Gezou, which is as follows:—℞. Salicylic acid 30 parts; ext. of cannabis indica 5 parts; collodion 240 parts. The collodion fixes the acid to the part, and protects it from friction; the cannabis indica acts as an anodyne, and the acid reduces and loosens the corn so that it comes off in four or five days. The remedy is applied with a camel's hair pencil, and if the corn is not well cured, the application may be repeated. In four or five days the patient should use a warm foot-bath and rub off the collodion. If any portion of the corn remains, the acid should be applied again and the treatment continued until the whole of the corn has disappeared. (Practitioner, Sept., p. 223.)

Chronic Dermatitis.—Dry patches of chronic dermatitis, clearly eczematous in origin, are curable by the application of tar. But the tar must be weakened down by being mixed with astringent and soothing mineral powders. This is the essential qualification for the benign use of tar in any form of skin disease; and it is because this precaution has been often neglected that the external application of tar has been passed over and even disparaged. Of all the emollient materials proper to be mixed with tar, chalk is *facile princeps*. Finely levigated chalk should be strewed into melted lard in a stone jar, and thoroughly stirred until cold. Now the chemically antacid properties of this compound make it valuable, but it is of great utility as a medium of potent medicaments which cure by a specific property, when used in a studied proportion, but irritate and inflame when that proportion is exceeded. Now if the merest morsel of ung. picis liquidæ be added to chalk ointment, just sufficient to yield a brown smear of colour (and the eye is the best judge in such a matter), the infiltration and scaliness of an old dry dermatitis will gradually soften down; and, if assisted by the right auxiliary means internally, there will be nothing left in the long run but a pigmentary stain. In many cases the addition of a small percentage of unguentum hydrargyri nitratis, or a few grains of the nitric oxide of mercury, is a material help. Do not these therapeutic facts show that one disease of skin-texture may glide into another? Subtle alliances of pathological kinship are suggested when we find that the remedy par excellence for the chief of squamous diseases may greatly alleviate the rough and almost ichthyotic specimens of infiltrated eczema which are met with on both extremities. (Dr. J. K. Spender, p. 326.)

Weeping Dermatitis.—Apply a soothing fluid which holds an astringent powder in suspension, and equally diffused through it. Take half an ounce of oxide of zinc, four scruples of the best calamine, a fluid ounce of glycerine, and seven ounces of lime water. Add a little lime water to the dry powders, and mix into a paste; pour in more lime water, and stir in a mortar until the ingredients are well mixed. Then put the whole into a bottle, and add the glycerine last. Before using, shake the bottle well, and pour a little of its contents into a shallow open vessel, as a saucer. Take strips of lint or linen rag from two to three inches wide, and of different lengths, to correspond to the different diameters of the limb. Soak them in the lotion, taking up on their surface as much of the powder as possible. Carefully adjust these medicated strips over the affected part of the limb; and then around all wind evenly and with gentle pressure a bandage made from a calico of open texture, like what is used by farmers as a covering for cheese. This process must be repeated at first every morning and evening, taking care that the strips are well moistened with warm water before removal, although the glycerine in the lotion prevents them from ever becoming quite dry. Commonly this plan succeeds very well. (Dr. J. K. Spender, p. 325.)

ECZEMA.—*Naphthol.*—Naphthol is even more active than tar, and its employment requires correspondingly greater caution. It can be used to replace tar when the stage suitable for tarry applications has been reached, or to complete the cure after tar has been applied and the disease seems still slow to take its departure. Either a one-half per cent. solution of naphthol in alcohol can be painted on the part once, or at most twice, a day for two or three days. If the application is well borne, the skin becomes light brown, smooth, and pale, and then the remedy is to be discontinued. Desquamation proceeds slowly and imperceptiby. So soon as the skin which is being painted with the solution of naphthol appears reddened, or the epidermis fissures ever so little, we must stop its use. Or another mode is to employ a 1 per cent. naphthol salve rubbed on thinly once or twice a day and then dusted over with powder. Here also the favourable result must make itself manifest within one or two days, when it is to be laid aside. Or the contrary appearances of heat in the skin and fresh irritation equally demand its disuse. As to diet in eczema, Kaposi remarks that under no circumstances does he see any objection to the use of acid substances, salted meats, or sausages, cheese or caviare: such neither aggravate the eczema nor the itching, nor do they give rise to the dreaded but non-existent "acridity of the blood." While we are inclined to agree with Kaposi that in the eczema of adults, at least, too much restriction has sometimes been put on the diet, still cases of eczema are continually being met with which are manifestly made worse by any digestive disturbance. From the dietary of such patients, materials which are notoriously difficult to assimilate should be eliminated. (Dr. Moritz Kaposi, Edin. Med. Journal, p. 1116.)

Antimony.—It is now several years since my colleague, Dr. Cheadle, pointed out to me the value of antimony in the treatment of the acute form of this disease. In the majority of the cases which have come under my care, its beneficial effect has been both marked and rapid. In the acute general eczema of adults, which usually commences somewhat suddenly by heat and burning on the flexor surfaces, and on other characteristic positions, and is soon followed by abundant exudation of clear fluid, and in the form known as eczema rubrum, I generally begin with four or five minims of the vinum antimoniale three times a day, increasing the dose gradually up to seven minims. After a few doses the exudation ceases, and the local irritation is much relieved; but, in order to prevent a relapse, it is necessary to continue the treatment until all traces of the eruption have disappeared. In acute eczema of children, the dose should be in proportion to the age of the child—half a minim or less up to six months, and one minim or less up to a year. As a rule, I have found both children and adults bear these quantities well, neither sickness nor diarrhœa being produced. In the case of aged persons, however, the dose should not exceed three or four minims to begin with, as diarrhœa may result from the administration of a greater amount. (Mr. Malcolm A. Morris, Brit. Med. Journal, Sept. 22, p. 572.)

Gelatine.—In eczema keeping the air from the part is sometimes as good as the best of remedies. One thing to be used for this purpose is gelatine as by the method initiated by Prof. Pick, of Prague. The gelatine is applied as follows:—A portion of the mass made by dissolving fifty parts of the purest gelatine in one hundred parts of distilled water, and which has been allowed to cool previously, is melted by putting it in a cup and placing the cup in hot water. To this is added, at the time when it is to be used, the required strength of salicylic acid, usually five per cent. When sufficiently cool, this mixture is painted upon the diseased parts with a painter's brush made of bristles. It must be applied evenly and not too thickly. When this is done properly it can be torn from the skin in quite large pieces, and it comes off without pain to the patient or irritation to the disease, and sounds like the tearing of tissue paper. The layer of gelatine is made about as thick as a sheet of writing paper, and after it has dried is gently covered with a minimum quantity of glycerine spread on with the hand. The use of glycerine is found to be necessary to render the gelatine layer pliable and to prevent its contracting, which it would otherwise do with considerable force, sufficient to irritate the skin. It is not practicable to mix the gelatine with the glycerine before it is applied, as this prevents its hardening sufficiently and renders it sticky. A very small quantity of glycerine makes the gelatine, after it has dried upon the skin, quite soft and pliable. With such a gelatine bandage, but seldom is itching felt, the diseased parts are seen through the transparent layer, and an ordinary bath removes all traces of it. There is no reason why the medicated gelatine should not be immediately applied in any cases of eczema at any stage, but experience has shown that salicylic acid first applied, in the moist stage of acute eczema, in the form of salicylated soap ointment, for a period long enough to reduce the inflammation, renders the use of medicated gelatine more prompt in its result. Dr. Morrison gives details of a number of illustrative cases. He says that the most satisfactory, both to patient and physician, are those chronic cases which appear so frequently at dispensaries. The patient is simply bandaged and sent off, to return in a week's time with a most satisfactory issue. (Dr. Morison, New York, Edin. Med. Journal, Oct. p. 376.)

Fœtid Feet.—M. Vieusse, principal medical officer at the Military Hospital at Oran, states that excessive sweating of the feet, under whatever form it appears (whether as mere supersecretion accompanied by severe pain, or with fœtidity), can be quickly cured by carefully conducted frictions with the subnitrate of bismuth; and even in a few cases where this suppresses the abundant sweating only temporarily, it still removes the severe pain and the fœtidity which often accompany the secretion. He has never found any ill consequences follow the suppression of the sweating. (Practitioner, Oct., p. 298.)

Gelatine Preparations in Diseases of the Skin.—Prof. Pick, of Prague, has introduced medicated gelatine as a clean and convenient dressing, thus obviating the necessity for bandages or plaster to retain the application. He says:—A year ago I called your attention to a preparation called Chrysarobin gelatinon (Goa powder with gelatin), and recommended its use in psoriasis to you. The method of applying it is already known to you; the chrysarobin is prescribed in the quantity necessary, and is applied to the parts when in a fluid state by a brush. Jarisch, in referring to this mode of application and medicament, said the problem is solved and the beneficial effects of chrysarobin in psoriasis is established, and all evil effects are done away with. There are several points to be observed. The first is to obtain a method by which we can apply a medicament to a large surface at once, when necessary, for in many cases it is necessary. Formerly in such cases we were obliged to apply an ointment or plaster to one part alone. This required time and skill, for when an ointment was applied to one part, before the other part was finished the former was rubbed off; it was also necessary to bandage the entire body of the patient. This required time and skill, and annoyed the patient, and ointments always soil the underclothes, &c. By using the gelatin preparations, all these inconveniences are avoided. Following this plan of treatment, I have used other gelatin preparations with advantage—pyrogallol (pyrogallic acid), naphthol (the active principle obtained from tar), iodoform, salicylic, and carbolic acids. The mode of applying is the same as with other preparations. The patient, after having been bathed in water, a heated solution of the gelatin is applied to the parts with a small brush. As soon as it becomes dry, a small quantity of glycerine is applied to the surface to prevent the coating from cracking or peeling off. This coating being transparent, allows you to see the progress of the treatment without removing it. In severe cases this procedure is to be repeated every second day: in milder ones it is sufficient to do so twice or thrice a week. These preparations can be applied by patients on themselves, and do not necessitate their being confined to a hospital or their home. It is a clean preparation, can be easily removed, does not soil the clothes, or prevent motion when applied over a joint; it is not expensive, does not crack or peel off. It is prepared in the following manner:—Dissolve 12½ ʒ of dry white gelatin in 25 ℥ of distilled water by a water bath, and while stirring add goa powder, pyrogallic acid, naphthol, iodoform, carbolic or salicylic acids, in whatever quantity necessary, allow it to cool, and the cake will take the form of the capsule in which it was prepared (a porcelain capsule is preferred). You can then direct the patient to take the necessary quantity, place it in a china saucer, apply heat to it, and when in a fluid state apply to the parts with a brush. I am positive that anyone resorting to this mode of treatment will never resort to the old manner of treating diseases of the skin by ointments, &c. (Prof. Pick, University of Prague, Dublin Med. Journal, Oct., p. 312.)

Traumaticene as a Substitute for Gelatine in Skin Affections.—Prof. Auspitz, of Vienna, following the same line of action as Pick, has substituted traumaticine for gelatine. Traumaticine consists of a solution of one part of purified gutta-percha in ten parts of chloroform. This forms an admirable adhesive, and continues unchanged and adherent to the skin for two or three days, or even longer. On the contrary, in his experience, the layer of gelatine is apt to separate in a few hours, in consequence of friction by the clothes or movements of the limbs, and needs frequent renewal. Again, the traumaticine produces a much thinner and more delicate film than does either collodion or gelatine, and therefore occasions neither tension nor pain. The traumaticine is more readily applied than gelatine; it does not stiffen so quickly, and the brush does not become matted into a stiff mass. The solution in traumaticine is permanent; the gelatine tends to become mouldy, even with the addition of salicylic acid. Psoriasis can be admirably treated with a solution of chrysarobine in traumaticine as follows: — After the chief part of the scales has been removed by means of a simple bath of soap and water, a ten per cent. solution is not only painted on, but rubbed in, with a narrow, short-haired painter's brush, to the patches. The application can be repeated every day, or every second or third day, in proportion to the extent of the disease. A bath is taken after each three or four applications. After at most twelve paintings the infiltration and scales will have disappeared, and in place of them are visible white patches bounded by a red or violet-brown areola. Neither in children nor in adults did any untoward results follow even a very extensive application to the body and face of the chrysarobine-traumaticine. The history of twelve cases is appended, which quite bears out the statement as to the rapidity with which the patches of psoriasis were removed. (Prof. Auspitz, Edin. Med. Journal, Oct., p. 376.)

LEPROSY. — Professor Kaposi is scarcely yet prepared to accept as proved that the bacillus lepræ is the medium of infection. He says, the cause of leprosy is not yet determined, but we are probably near the truth in believing that circumstances of a physico-geographical nature, perhaps by being favourable to the bacillus, chiefly condition it. Thus we can best explain the occurrence of the disease in persons who have taken up their residence in leprous districts, and also the experience that in families affected with leprosy the disease sometimes dies out when they move to districts where leprosy does not exist. Children and descendants may also inherit the tendency to leprosy, as to any other dyscrasia. (Prof. Kaposi, Edin. Med. Journal, June, p. 1117.)

LUPUS VULGARIS.—*Scraping and Scarification.* — Scraping, or erosion, and scarification are the two surgical methods which have so completely changed the prognosis of this disease. Arsenic, as used by Hebra, was perhaps the most effectual of the caustics, because it destroyed only the lupus and not the sound tissue, but from the fear of its toxic effects never gained any real ground in this country. This serious objection was met by Volkmann's process of free scraping or erosion by means of a blunt spoon. This simple and easy method of treatment was a marked step in advance, and has received the support of many British surgeons. Several cases have been reported in which complete cure was obtained. I have myself treated a considerable number of cases in this way. The plan I adopted was, with a few minor modifications, identical with that originated by Volkmann in 1870. With a large spoon, all scabs are thoroughly removed, and with them the great bulk of the superficial deposit; and after drying the surface, the minute nodules which are deeply lodged in pockets of the corium, are dug out with smaller and pointed scoops. The margins are also vigorously scraped. The spoon should be applied till the whole of the soft friable lupus-tissue has been removed, and only the firm resistance of the sound parts is met with. Though the greater portion of the disease may be removed at one operation, some of the smaller deep-seated nodules which have escaped will reappear in the scar, and require subsequent treatment. After the healing of the wound produced by the operation, a scar with more or less loss of substance is left. The great advantage of this treatment is the rapidity with which a cure can be obtained; and if a large surface be affected, in a position in which a scar is of no consequence from its appearance, it is, on the whole, the best that can be recommended. On the face and other exposed parts the appearance of the cicatrix is a matter of some importance, and it is here that the other mode of operation, scarification, yields better results. I would here mention, that in lupus of the mucous membrane I have had the most satisfactory results from scraping. The method of multiple punctures, as suggested by Veiel of Canstatt in 1871, is effective but tedious in application, and I have preferred to practise linear scarification with a narrow triangular pointed knife, as used by Professor Vidal of St. Louis Hospital, Paris. The little operation is performed by pressing the sharp point of the knife, which should be held like a pen, on the sound skin at the edge of the lupus-growth, and quickly drawing it across the mass to the healthy skin on the opposite side. In its course it should penetrate the entire thickness of the morbid nodule, dividing at its base the fibrous bundles of the corium. Other incisions, parallel to this, should be made as close as possible, and these should be crossed by others at right angles. The bleeding, which is slight, is easily checked by a compress of cotton-wool, and the little cuts heal rapidly. After a week's interval, the operation should be repeated. Occasionally two or three operations are all that is needed, but more often it is necessary to repeat them several times. The scar left is smooth, supple, and usually distinguishable from the healthy skin only by its paler colour, being little if at all depressed. In the severer ulcerating forms of lupus, especially in lupus exedens, the one alluded to in the opening of the paper, scarification, to be of service. must be used more boldly. We have sometimes to plunge the whole blade of the knife into the mass for a depth of one-half to three-quarters of an inch, to incise it in all directions, leaving the part in a condition literally of mincemeat, but without removing any portion of the tissue. This plan, I can state from my own personal experience, is most effective, and fully merits the favourable recommendation of Vidal. (Mr. M. A. Morris, Brit. Med. Journal, Aug. 18, p. 322.)

PEDICULUS PUBIS.—Kaposi states, like every other author we can remember, that the crab louse lives in all the hairy parts of the body *except the scalp.* Till quite recently we held the same opinion; but we were shown specimens of the pediculus pubis and nits of the same louse attached to the hair—showing that the animals were thriving—which had been removed from the head of a young child. How the creatures had got there there was no evidence forthcoming; but they were most numerous round the edges of the scalp hair, if not entirely confined to that region. That the pediculus pubis *may* live in the scalp hair must be accepted as proved. Whether the converse may occur—whether, that is, the head louse can thrive among the hairs of the beard or axilla—has not been noticed. (Prof. Kaposi, Edin. Med. Journal, June, p. 1118.)

PRURIGO.—*Antimony.*—In this troublesome affection, frequently met with in our out-patient rooms—the relation of which to the severe form known on the Continent as Hebra's prurigo, Mr. Morrant Baker pointed out at the International Congress of 1881—antimony is of great use. Three or four minims of the vinum, continued over a long period, allays the itching to a large extent, and often prevents the relapses of eczema. In several cases, after arsenic, iron, iodide of iron, cod-liver oil, and numberless other tonics had been tried, antimony was the only drug that produced any benefit whatever. When given in the before-mentioned doses continuously for more than a year, I have never seen sickness, diarrhœa, sweating, or debility: but, on the contrary, the appetite improves and the weight increases. I have not had the opportunity of trying the remedy in a patient older than 18½ years suffering from this disease; but in one particular case of that age, the benefit was most marked while the drug was being taken. (Mr. Malcolm A. Morris, Brit. Med. Journal, Sept. 22, p. 572.)

Naphthol.—There is certainly much truth in Hebra's observation, that tubercular mothers—and, in my experience, those who are anæmic and affected with chronic catarrh of the apices of the lungs, aggravated during pregnancy—bear children especially liable to prurigo. In the treatment of prurigo naphthol has proved itself of marked value, applied as a weak ointment or used as a naphthol and sulphur soap. Kaposi would do away with the employment of counterirritants such as mustard or cantharides. The staining of the skin produced by these may, he says, sometimes last a lifetime, and this knowledge should restrain the physician from blistering the face or bosom, if it does not induce him to abandon, as a general rule, such curative measures. (Prof. Kaposi, Edin. Med. Journal, June, p. 1117.)

Pruritus Ani.—Allingham states that he has seen a bad case of this disease cured by the use of the subjoined lotion in forty-eight hours. ℞. Liq. carbonis deterg. (Wright's), glycerine, āā ℥j; pulv. zinci. oxid., pulv. calamin. prep., āā ℥ss; pulv. sulph. precip., ʒ ss; aquam ad ℥vj. M. The part affected is to be thickly painted over with this, once or twice a day, and allowed to dry. (Kelsey on Diseases of Rectum and Anus, 1883.)

Psoriasis.—*Sanitas Oil.*—In a case of psoriasis of fifteen years' standing, where nearly every kind of treatment has been tried—including long courses of arsenic (which were injuring the patient's health), chrysophanic acid, tar ointment, turpentine, &c.—with only slight benefit, I was induced to try an ointment composed of vaseline, oxide of zinc, and sanitas oil, and was rewarded by a speedy removal of most of the patches of psoriasis, the usual brown discolouration of the skin, and a few small irritable spots alone remaining, which are disappearing under the same treatment, now continued for a month. I suppose the *modus operandi* is similar to turpentine and like preparations, but sanitas oil has one very great advantage over other applications, and that is its cleanliness and freedom from disagreeable odour, and the fact that the linen of the patient is not stained or injured, which is a great consideration in private practice. (Mr. R. H. Paterson, Gainsborough, Lancet, July 7, p. 45.)

Chrysophanic and Pyrogallic Acids.—At a recent meeting of the New York Dermatological Society Dr. Morrow formulated the following conclusions touching chrysophanic and pyrogallic acids:—1. That chrysophanic acid is perhaps the most efficient agent known to the profession for the external treatment of certain cases of psoriasis, especially chronic cases which have resisted other methods of treatment. 2. That its range of application is limited; in children, in patients with sensitive, irritable skins, and in acute cases generally, it is contra-indicated. 3. That in psoriasis affecting the face and hairy scalp the intensely irritating action, producing puffiness of the face and eyelids, and its discolouring effect upon the hair, render its employment impossible. 4. That it is prompt in its action, a week or ten days' active treatment being usually sufficient to develop its full therapeutic efficacy.

5. That its curative effect is only temporary; it does not afford a safeguard against relapses. 6. That it probably acts only locally and by virtue of its irritating properties, setting up a substitute inflammation, which modifies or corrects the tendency to the inflammatory overgrowth of epidermic cells. 7. That its employment is attended with certain objectionable results, some of which always follow its use, while others seem to depend upon idiosyncrasy, physiological and morbid predispositions, &c. 8. That a brownish, prune-juice discoloration of the skin, which persists long after the application is discontinued, a reddish staining of the hair and nails, and an indelible dyeing of the clothing, are inseparable from its use. 9. That the erythematous and furuncular inflammations which occasionally follow its use may be classed as incidental effects, as they do not always depend upon an excessive strength of the preparation employed, but are frequently manifest after a mild application; intense dermatitis, resulting in exfoliation of the epidermis in large flakes, has been observed after an application of ten grains to the ounce. 10. That the strength of the ointment recommended by Balmanno Squire (two drachms to one ounce) is excessive; a milder strength (twenty grains up to one drachm to one ounce) being usually sufficient to develop the full therapeutical virtues of the drug. 11. That in other diseases for which it has been recommended—as acne, favus, pityriasis versicolor, eczema marginatum, &c.—chrysophanic acid possesses no advantages over certain other drugs which are commonly used. 12. That pyrogallic acid is a drug which is free from some of the more objectionable features of chrysophanic acid. It does not (in ten-per-cent. ointment) inflame the skin, it does not produce œdema of the face when applied to the scalp, and the discoloration is much less marked and permanent. 13. That it should, nevertheless, be used with caution, as pernicious results have followed its too free use. When freely used for two or three weeks it produces an olive-green or tarry condition of the urine, with prostration, febrile disturbance, and other general symptoms. 14. That its curative action in psoriasis is much less rapid, but apparently more permanent than that of chrysophanic acid. 15. That its freedom from irritation and its absence of odour render it an admirable substitute for chrysophanic acid and oil of cade in diseases affecting the scalp and face. 16. That while its effect in psoriasis is slower and less brilliant than that of chrysophanic acid, its range of therapeutical action is much more extended. It causes to disappear the nodosities of lupus, the hyperplasiæ of syphilis, epidermic and papillary hypertrophies, and seems to have a good effect in promoting

the cicatrisation of wounds. 17. That it seems to act by virtue of its stimulant and irritating properties; it hardens and shrinks the tissues, shrivels up unhealthy granulations, and acts as a hæmostatic. (Dr. Morrow, Dublin Journal of Medical Science, April, p. 337.)

SALICYLIC PASTES IN SKIN AFFECTIONS.—Lassar points out that to many patients even freshly prepared ointments are irritating, and he explains this by suggesting that the fatty acids become decomposed during the friction on the skin, and set up inflammation and swelling. Vaseline, used as a substitute for animal fats and oils, is not consistent enough. A suitable consistency is obtained by slowly rubbing up equal parts of oxide of zinc and starch with vaseline. A snow-white paste is thus produced, quite permanent and serviceable as a vehicle for other medicaments. This does not become liquid at ordinary temperatures, but dries pretty quickly, and can be maintained solid if the surface is warmed by dusting powder over it. By its means parts can be kept protected from the air without any other dressing, which are not so well adapted for ointments alone. Hairy parts alone should not have it applied to them, since it mats the hairs together. The paste has no irritating effect. Its greatest advantage consists in its porosity, a feature in which ordinary salves are deficient. This is best observed after scarifications or superficial erasions and in moist eczema. The wounded surface should be cleansed with carbolic or corrosive sublimate solution, and then a two per cent. salicyl-vaseline-zinc paste is applied with a brush which has been boiled and washed in a two per cent. sublimate lotion. The paste so applied is allowed simply to dry, or covered with a thin layer of lint and turn of a bandage. In a few days the little wound has become smoothly healed without scar. Salicylic acid is specially useful in eczema, and particularly when used as a two per cent. vaseline salve or vaseline zinc paste. In the common eczemas of the head in children, so numerous in dispensary practice, after two or three thorough cleansings, the daily application of the following salve nearly always suffices to obtain rapid and lasting results:—℞. Acid salicylic, gr. x; tinct. benz., ♏xx; vaseline, ℥j. M. Ft. ung. On other parts where a soft salve which easily melts as this is not suitable, where a firm dressing or drying effect is desired, the following paste should be rubbed on:—℞. Acid salicylic, gr. xix; vaselini, ℥j; zinci oxidi, amyli, āā, ℥ss. M. Leniter terend., fiat paste. So long as the secretion is abundant, the dressing should be daily renewed. Sometimes, when it dries hard, it tickles the skin; it should then be rendered soft by subsequent inunction with vaseline. (Edin. Med. Jour., Sept., p. 278.)

SCABIES.—*Naphthol.*—For the treatment of scabies a naphthol salve is recommended before all others. The composition is as follows:—℞. Adipis, 100; saponis mollis, 50; B. naphthol, 15; cretæ preparat., 10. One application of this ointment causes the burrows to shrivel up, and the eczema and itching to be arrested. At the same time the skin acquires an agreeable pliancy, while absence of colour and smell (?) are further recommendations. The patient should thereafter don woollen underclothes or keep between blankets and remain quiet till the skin becomes dry, nor take a cleansing bath till the dry epidermis is loosened and the concomitant eruptions, such as eczema or urticaria, have subsided. From three to five days may be allowed, as a rule, for this. (Prof. Kaposi, Edin. Med. Journal, June, p. 1118.)

TINEA TONSURANS.—*Naphthol.* — Kaposi still maintains the parasitic nature of tinea tonsurans maculosa when occurring as a general acute eruption of the trunk and extremities, and makes no allusion to the views of Behrend and Jamieson. These latter are of opinion that this so-called universal form of tinea tonsurans is seldom, if ever, parasitic, but is a ringed, persistent erythema, or what has been described as pityriasis maculata et circinata. There is, however, a peculiarity in the disease as seen in Vienna. Tinea tonsurans universalis is extraordinarily frequent in Vienna, from 3 to 5 per cent. of all skin diseases; while tinea tonsurans capillitii is very rare, scarcely 0·1 per cent. Kaposi says that during the first days of the development of tinea tonsurans maculosa only scattered spores are discoverable; and for the first time, after a duration of two or three weeks, can the characteristic mycelium be found in the scales from the larger patches. In what in its clinical features corresponds in this country to the universal form of tinea tonsurans no parasitic elements are discoverable, though such are easily made out in tinea circinata or ringworm of the body, and in eczema marginatum. The fact of the rarity with which ringworm of the head, as compared with ringworm of the body, occurs in Vienna is singular, the exact reverse being the case here, while no case of the universal acute form where the fungus has been demonstrated has, so far as we are aware, yet been recorded in Britain. For the treatment of this acute universal form Kaposi now recommends soft soap with two per cent. of B. naphthol. This is to be rubbed into the skin for two or three days twice a day. The body is then to be dusted with powder, and no baths taken till, at the end of a fortnight, the dry, shrivelled cuticle has completely desquamated. In the former edition soft soap alone was used for the same purpose; the addition of naphthol, which for many purposes is a great favourite at present with Kaposi, will possibly make complete desquamation more certain. For tinea tonsurans of the scalp the author praises the following, to which also naphthol has been now added: ℞. Ol rusei, ʒ j; sp. saponat. kalin., ʒ iss; sulphuris precip., grs. xl; sp. lavand., ℥ ss; bals. Peruvian., grs. vj; naphthol, grs. ij. (Prof. Kaposi, Edin. Med. Journal, June, p. 1117.)

Ulcers.—*Boracic Acid Lint as a Dressing for Large Ulcers.*—Apply boracic acid lint in *three dry folds*, retaining the muslin next to the sore, and covering all with Mackintosh and bandage. These dressings to be allowed to remain for three days, and carefully removed under a stream of water; afterwards the sore may be cleaned with boracic acid lotion before applying the dressings. (Dr. A. Pearson, p. 328.)

Warts on the Hands.—Warts may be removed by cauterisation as recommended by Dr. Cellier. An ordinary pin is thrust through the base of the wart, care being taken not to wound the healthy tissue beneath. Then the skin being protected, the head of the pin is heated in the flame of a candle. It is said that the wart becomes white and fissured in a few minutes, and comes away on the point of the pin. Dr. Cellier also says that it is only necessary to remove one wart on the hand, that though there may be a dozen, all the others will disappear without treatment. (Glasgow Med. Journal, Sept., p. 230.)

SYPHILITIC AFFECTIONS.

Acute Orchitis.—*Salicylate of Soda.*—In recommending this plan of treatment I would advise that only acute cases should be selected, the evidence of that condition being a distinct rise of temperature as ascertained by the thermometer. The dose of the salt should not be less than twenty grains, and should be repeated hourly until at least three doses are taken; afterwards the same dose may be continued at longer intervals. (Dr. E. Henderson, *Retrospect*, vol. 87, p. 353.)

Chordee.—*Injection of a Solution of Bromide of Potassium.*—Dr. Cambillard advocates the employment of a solution of potassic bromide to quiet chordee. Every one will admit, he truly says, that the painful erections called chordee are very difficult to relieve, and that the number of the remedies proposed is only equalled by their inefficiency. He has obtained uniformly good results from urethral injections of the following:—℞ Aquæ, ℥ ij.; glycerini, ʒ iij; potassi bromidi, ʒiss; tinct. opii, ʒj. M. Sig. Four injections of this quantity in twenty-four hours. To prevent the nocturnal attacks, he insists that the last injection be practised just on retiring for the night. These injections cause almost no pain, and are very effective in relieving the distress. (Dublin Journal of Med. Science, April, p. 375.)

Warts on the Genitals.—*Chromic Acid.*—So long ago as 24th January 1857 there is an account in the Lancet of that date of some cases of warts on the genitals treated by Mr. John Marshall, at University College Hospital, with chromic acid. In one severe case, after having tried all manner of caustics with only temporary benefit, Mr. Marshall found the application of chromic acid, gr. 100 to ℥j. of water, quite successful, and much less painful than any other escharotic he had tried. In the Lancet of the same year Dr. Key of Arbroath describes a case of a warty growth affecting the nose and upper lip, in which the acid was applied with most satisfactory results and very little pain. Since then cases have appeared from time to time in the journals, showing the efficacy of the treatment of warts by chromic acid; but I believe the usefulness of this treatment has not been so much recognised as it deserves to be. While speaking of the application of nitric and glacial acetic acids to warts, in his work on Syphilis and Local Contagious Diseases, Mr. Berkeley Hill states that "chromic acid is more powerful than either of the preceding, but it causes severe pain." My experience of the use of chromic acid is, that it makes warts on the genitals disappear with marvellous rapidity, and that the pain from it is markedly less than after the use of any of the other numerous escharotics I have tried. Mr. Marshall recommends a lead lotion to be applied after using the acid, "to relieve the subsequent soreness," but this precaution against pain is hardly necessary. It has been recommended to use a glass rod for the application of the acid; but as chromic acid does not burn vegetable textures, I have found some cotton-wool tightly rolled round the end of a pair of artery forceps a more accurate and handy instrument for its application. There is by this method less risk of injuring the surrounding healthy mucous surface. One hundred grains of the acid to one ounce of water is a sufficiently strong solution for ordinary cases. The warts should be carefully dried before the acid is used, and afterwards dry cotton-wool applied. Chromic acid efficiently takes the place of ablation by the knife or scissors, and has the advantage of being a bloodless method and much less painful. It is hardly necessary to add, in conclusion, that the warts or vegetations on the genitals of which I have spoken are, like similar growths in other parts of the body, strictly local in their nature. So-called *syphilitic warts* have no existence. (Dr. Cadell, Edinburgh Med. Journal, April, p. 900.)

WARTS AND CONDYLOMATA,—*Carbolic Acid.*—M. Jullien has described in the *Annales de Dermatologie* the treatment used by Tommaso de Amicis and himself in cases of warts and condylomata. It consists in repeated cauterisations by means of pure carbolic acid, and is best adapted to large sessile growths, or to fumigating cauliflower-like vegetations. The *modus operandi* is very simple. Crystals of pure carbolic acid are kept in a small bottle; the warts having been washed, the bottle is warmed in a flame or in nearly boiling water and the crystals touching the glass melt. The fluid is supplied with a brush or cotton wool to the whole surface of the warts, which assume at once a shiny white appearance. The white layer soon falls off, and on the next day the operation can be repeated. Pure carbolic acid causes much less pain than either chromic or acetic acid. It has been noted that when the cauterisations are repeated, the last are more painful than the first. The number of cauterisations necessary for curing the patient is, of course, variable. In a case of vegetations on the glans and perpuce, the cure was complete after two applications. (British Med. Journal, Aug. 4, p. 213.)

Dr. Nussbaum recommends the treatment of small condylomatous patches on the penis by daily washings with salt solution followed by the sprinkling over them of calomel powder. Chemical change takes place, and corrosive sublimate is produced; the condylomata disappear, and no pain is felt. Solution of corrosive sublimate in collodion, which acts more quickly, gives rise to much pain, and requires the patient to rest in bed. The proposed method is not new, but has fallen into unmerited disuse. (Practitioner, Oct., p. 298.)

A year ago a patient came to us, who, besides suffering from icterus, due to catarrhal inflammation of the bile-ducts, was affected with condylomata also. As the latter were very large, preventing the prepuce from being drawn forward, their removal was desirable. They gave rise to an annoying itching and to a fœtid odour. Not wishing to operate on them while the patient still had the jaundice, we told him to dust the parts daily with ℞. Hydrarg. muriat. mit., ʒj; acid. borac. pulver., gr. 10. M. Fiat pulvis; and were not a little astonished to find three weeks later not a sign of them left. They were all absorbed. Since then we have often had occasion to use this powder, and invariably with the same good success. (Med. and Surg. Reporter; Dublin Journal, April, p. 348.)

AFFECTIONS OF THE EYE.

Eversion of the Eyelids.—*Transplantation of Skin Flaps without Pedicles.*—In skin-grafting, I have, in my opinion, demonstrated that in most cases the pedicle is not essential to the vitality of the flap. If we wish a skin-flap to adhere to a new surface by first intention or agglutination, we must be sure that it is free of all areolar tissue, and properly fixed in its new place. When thus prepared, we may cut the flap of any shape or size from any other part, or from another person, and transplant it without pedicle. The shape and size of skin required must be carefully cut out in lint. The piece of lint is then laid on the forearm which is in a state of semi-supination, and the shape traced by the point of a knife, making it larger all round to allow for shrinking. I find that the most satisfactory way of removing the subcutaneous tissue is to snip it off with sharp scissors from the flap spread out on the left fore-finger, then dip the flap in tepid water, and dry it properly. After the flap has been prepared, it is put on its new site and moulded into position. I prefer not to use sutures for keeping it in place, as the very finest threads sometimes give rise to exudation of pus when the ligature is withdrawn. The best method, if practicable, will after all be that adopted in my first case, namely, to dissect the neighbouring part all round, and push the edges of the flap under it. After the flap has thus been properly moulded into its new site, lint soaked in hot water is held upon it for five or ten minutes, and then a few other pieces of lint wrung out of hot water are laid upon the new flap, and the whole covered and secured by an immovable bandage. The application of carbolic acid, or any other irritant substance, should be avoided as prejudicial, inasmuch as it is apt to remove the cuticle. The head should be kept steady and warm. The patient is kept in bed well covered, and supplied with warm drinks to keep up the temperature of the body. The eye should not be disturbed for the first three days after the operation, after which the dressing should be carefully removed, the last ply of lint being properly soaked with hot water, that it may be removed easily without any dragging or derangement of the flap. It may then be dressed every twenty-four hours thereafter. I have reason to think that some cases did not succeed on account of the *nimium diligentiæ*, and teasing of the part, which requires peace and quietness for its growth. (Dr. J. R. Wolfe, p. 331.)

Granular Lids.—*Boracic Acid.*—Dr. James L. Minor says that he has found boracic acid powder a most excellent application to granular lids. It is used as follows:—The lids being thoroughly everted, the powder is spread freely over the whole conjunctival surface with a camel's hair brush. The acid is generously applied, and mixing with the discharge from the lids, it readily gains access to the cracks and crevices between the granulations, and thus comes into direct contact with the entire surface upon which it is intended to act. The immediate effect is to increase lachrymation and to cause a burning, gritty, sensation, with some pain. These symptoms usually pass off within ten minutes, and are followed by an amelioration of all the symptoms which existed before the application of the acid. The granulations may look less gorged and prominent, but he has not been able to discover much change in the naked-eye appearance of the conjunctiva after one application. The powder was used three times a week. The improvement is so gradual that it is almost imperceptible as it progresses, but Dr. Minor has derived more satisfactory results from the use of this powder than from the ordinary caustic or astringent applications. (Medical and Surgical Reporter; and Dublin Journal, April, p. 336.)

IRIDECTOMY.—*Reasons for Performing Iridectomy in the Operation for Extraction of Cataract.*—These are patent. First, in whatever way the operation is performed without removal of a portion of the iris, coughing, vomiting, or failure of some part of the wound to unite, frequently leads to prolapse of the iris. Iridectomy materially diminishs or entirely abolishes the chance of this very troublesome accident occurring. Secondly, in a large number of cases, however, skilfully the operation is executed, a considerable quantity of cortical substance of the lens remains behind the iris. This, swelling, especially in gouty persons, irritates the iris and sets up iritis, or gradually filling up the area of the pupil, causes secondary cataract, with adhesions of the iris to the remains of the capsule and lens. Iridectomy enables the operator to remove the greater part of such residue of the lens, and thus prevents a second operation. Lastly, when the lens is large and the section is a trifle small, the lens in escaping may stretch, tear, and bruise the iris, and again lead to iritis. By iridectomy all chance of this accident is avoided. Those who practise iridectomy know very well that it has troubles of its own. The hemorrhage from the cut vessels is troublesome, and is withal of bad augury, as showing that the vessels are not healthy. The wound of the iris sometimes induces iritis; and prolapse of the cut edges at the corners of the corneal incision, almost as painful and troublesome as complete prolapse, sometimes occurs. We are inclined to think that in spare healthy subjects, from fifty to sixty-five years of age, with otherwise sound eyes, iridectomy may be dispensed with;

but that when from any cause the result of the operation appears doubtful by anticipation, it will be prudent to have recourse to it. Vision is as perfect after it has been done as in cases where it has been omitted. (Editor of Lancet, July 21, p. 132.)

PURULENT OPHTHALMIA.—Recently, Crédé has adopted with signal success a simple plan of treatment—namely, the instillation of a single drop of a 2 per cent. solution of lunar caustic between the slightly separated lids. Of 300 children thus treated, no instance of purulent ophthalmia occurred, even of the mildest type, and no injurious effects followed the instillation of the drop in any case. The mothers were in many instances affected with syphilitic, gonorrhœal, and leucorrhœal disease. He believes that no other of the antiseptic remedies is so safe, so easy, and so innocent as this. It seems to me to be certainly worthy of general trial. Crédé's first suggestion has been adopted in this country by Dr. Grossmann in the Liverpool workhouses, with very satisfactory results; but in a letter which Dr. Grossmann was good enough to write to me, in reply to an inquiry on my part as to whether he had continued the plan since his paper appeared in the Lancet, he says that in one of the workhouses the house-surgeon now always applies iodoform, which he finds answers very well. Grossmann dusts the fine powder over the everted lids once in twenty-four hours, but finds that it is more easily applied in solution by the nurses. De Wecker and Landolt in their authoritative treatise remark that De Gräfe was one of the first to introduce a rational treatment of purulent conjunctivitis by the intelligent and appropriate treatment of caustics, but the right time must be chosen. It is not sufficient to drop in a strong solution for its action, if the secretion is abundant, and there is a risk that the cells of the surface of the cornea may be injured and complications on the side of this membrane favoured. Hence if this membrane be affected at all, cauterisation of every kind should be abstained from. The mode they recommend is to cauterise the palpebral conjunctiva and that of the sinus alone. They employ by preference the solid mitigated nitrate, consisting of one-third of nitrate of silver fused with two-thirds of potash nitrate, though lately they have thought that corneal troubles were sometimes referable to this method, however cautiously performed, and have resorted to the use of a 2 per cent. solution of the silver nitrate. If the solid mitigated nitrate be used, a brush dipped in a solution of common salt should be at hand and applied to the lid, with the view of neutralising any excess of the nitrate, and the lids should then be freely washed with pure cold or cool water.

In ten or fifteen minutes the eschar begins to separate, and becomes quite detached in the course of an hour. The lid in the meanwhile becomes hot and painful, and there is much lacrymation. A period of remission follows, succeeded by one of recrudescence, when the cauterisation may be repeated. (Dr. H. Power, p. 334.)

ULCERS OF THE CORNEA.—The medical treatment should consist in the administration of a good purge composed of jalap or scammony and calomel, the use of which is often shown by the expulsion of one or two round or a mass of thread worms. The frequency with which this affection is associated with the presence of worms is an additional evidence to the view I take that the cause of the disease is disturbance of the functions of the intestinal canal. As soon as the purge has acted, the administration of quinine may be commenced either pure or in the form of the ferro-citrate. When the intolerance of light is considerable, a drop of a two-grain solution of atropine may be instilled every or every other morning; but by far the most effective local remedial means is found in what is commonly called Pagenstecher's ointment, which is a combination of vaseline with binoxide of mercury in proportions varying from one to ten or even fifteen grains to the ounce. This forms a yellow ointment, which in the milder forms gives scarcely any pain, but in the stronger proves sharply irritating to the eye, inducing free lacrymation, considerable congestion of the conjunctiva and pain lasting some minutes. It is, moreover, exceedingly effective, and may almost be regarded as a specific for phlyctenular ophthalmia. (Dr. H. Power, p. 339.)

WEAKNESS OR PARALYSIS OF CILIARY MUSCLE.—*Eserine in very Dilute Solutions.*—I have made experiments on myself and others with solutions of eserine, of strengths varying from gr. $\frac{1}{80}$ to gr. 1 to the oz. (gr. $\frac{1}{80}$, gr. $\frac{1}{40}$, gr. $\frac{1}{24}$, gr. $\frac{1}{20}$, gr. $\frac{1}{12}$, gr. $\frac{1}{4}$. and gr. 1), most of the trials being on my own eyes, which are, I believe, nearly normal in every respect. I will now give the general results of a number of experiments carefully recorded at the time of observation. First, as to the effect on the ciliary muscle. It is a somewhat difficult matter to separate the result of increased power of accommodation from that produced by contraction of the pupil, for either will cause a greater acuity of near vision. The following effect was interpreted to mean increased action of the ciliary muscle, independent of any contraction of the pupil. A varying time after applying the solution to one eye, which, for distinction, we may call the affected eye, small type viewed with both eyes became indistinct, this being evidently due to dimness of the affected eye. When the latter was closed, the print was clearly seen by the normal eye; when, on the other hand, this was closed, sight with the affected eye was at first dim, but on relaxing the accommodation, or bringing the type closer, vision again became clear. With the weaker solutions (gr. $\frac{1}{12}$ to gr. $\frac{1}{80}$) this dimness was only noticed during near vision, letters at twenty feet being perfectly distinct; thus, I think, indicating that the action of these weak solutions is to cause increased irritability, rather than a state of spasm of the ciliary muscle, so that the same effort of accommodation causes a stronger contraction in the affected eye than in the other; hence, while the normal eye is naturally accommodated correctly, the other is sighted for too near a point, and the type is therefore indistinct. From this mode of action arises their great value; they do not cause an artificial state of myopia, such as is produced by a four or even a one-grain solution, but only a more ready reaction of the ciliary muscle to nerve-stimulus, the very improvement that we desire when that muscle is deficient in tone. Now, in my own eyes, this peculiar action on accommodation was distinctly, though but slightly, evident after the use of the $\frac{1}{80}$ gr. solution, as also was the case in two other persons experimented upon; while, in a third, neither this nor the $\frac{1}{40}$ gr. solution had any effect. The accommodation commenced to be influenced from five minutes (gr. 1) to twenty minutes (gr. $\frac{1}{80}$) after instillation, and the effect lasted to a noticeable extent from two hours (gr. $\frac{1}{80}$) to four hours (gr. 1). The full action of the one-grain solution was accompanied by the well known pain of an over-worked hypermetropic eye, but the use of the weaker solutions caused no pain or distress of any sort, another recommendation for their use in preference to those of greater strength. The pupil was in each case contracted to a degree corresponding to the effect on the accommodation. The contraction always commenced very shortly after that of the ciliary muscle, but lasted for a much longer period, even for two or three days after the use of the stronger solutions. In the case of the $\frac{1}{80}$ gr. solution, the effect on the accommodation was noticeable for at least five minutes before the pupil could be seen to be contracted, and ceased long before the latter returned to its natural size, clearly proving that the increased power of near vision was not alone due to the smaller size of the pupil. All the solutions caused twitching of the palpebral portion of the orbicularis—very slight with the weakest, considerable with the strongest. This commenced in from five to fifteen minutes after instillation, and continued for from fifteen to forty minutes. The twitching was increased by straining the accommodation to near vision. (Dr. J. C. Uhthoff, p. 344.)

MIDWIFERY, ETC.

Anæsthetics during Labour.—The following precautions would render the use of chloroform justifiable. 1. There are certain women who have a tendency to flood at every confinement, and others in whom there seems an already too great relaxation of fibre—weak anæmic females in their eighth or tenth confinement; and to these it would be unadvisable to give chloroform, except for necessity. Happily, it is not these women who suffer the most pain, but rather those strong healthy primiparæ whose pelves and general build approximate to the masculine type. 2. We should not give it when labour is complicated with severe vomiting, or with acute disease of the heart or lung, unless there be imperative call for it. 3. It should not be given to the full extent, except for operation, convulsions, or spasm of the cervix; and then it is most necessary that one person should devote his entire attention to it. 4. The inhalation should be stopped directly we find the pulse becoming very weak, or the respiration irregular. 5. Anything which makes us suspect a fatty or enfeebled cardiac wall should make us cautious in the use of chloroform. Here, as in cases other than those of labour, it is not the most extensive valvular disease (so long as it be attended by compensating hypertrophy), but the atrophied or degenerate wall that constitutes the source of danger. Unfortunately, the signs of these conditions are subtle and uncertain; but a fatty heart may be suspected by an exceedingly feeble cardiac impulse, combined with an almost inaudible first sound; or attacks of dyspnœa, vertigo, and syncope, in the absence of anæmia, or valvular lesion; or the copious deposit of fat in other parts of the body, and the occurrence of dropsy without adequate cause. A dilated heart may be suspected by increased area of præcordial dulness, combined with epigastric and venous pulsation, and a want of correspondence between the violence of the cardiac impulse and the strength of the pulse. Pericardial adhesions also form a great source of danger. They may be suspected when the heart's apex is fixed above its normal position, and does not shift with respiration: or when there is depression instead of protrusion of intercostal spaces over the position of the apex, giving a wavy character to the cardiac impulse. 6. The sixth and last precaution I would mention is this. In all cases we should take extra care to prevent the occurrence of hemorrhage after birth; by giving a full dose of ergot in a little warm water when the head reaches the perinæum; by ceasing the chloroform immediately it is born; and by rousing the patient from her lethargy as soon as possible. (Dr. Thomas D. Savill, p. 358.)

It has more than once happened to me when giving chloroform in labour to find that when the head has passed the outlet, the patient who has seemed so little anæsthetised as to complain of excessive pain, and beg for more chloroform, suddenly passes fully under the influence of the drug, and becomes profoundly unconscious; complete delivery follows, and profuse flooding at once sets in. Subcutaneous injection of ergotine, Bonjean's, is the remedy I adopt, together with strong pressure on the uterus, and what other general measures may seem desirable. The point I would wish to insist on is, that instead of "crowding on" chloroform at the last, one should then be very sparing in its use, although loudly begged by the agonised patient to give more and more. (A Country Doctor, Brit. Med. Journal, May 19, p. 194.)

AXIS-TRACTION FORCEPS.—1. The extraction of the fœtal head through any part of the curved parturient canal demands the use of a forceps having the pelvic curve (curve of Smellie and Levret). 2. Extraction with such an instrument cannot be made without loss of power and mis-direction of power, unless the handles have a compensation curve (perineal curve of Johnstone, Moralés, Hubert, and Aveling). 3. The addition to the blades by a joint or hinge of compensationally curved traction-rods gives the possibility of correct axis-traction, while the change impressed on the direction of the fixed application-handles affords an index to the operator as to the line in which at any moment he ought to pull (axis-traction rods of Tarnier). (Dr. Alex. R. Simpson, p. 349.)

Forceps in Labour.—I am in the habit of using the forceps in a very large proportion of my primiparous cases, and of applying them pretty early, often before the os is fully dilated, and for more than two years I have made traction only during the interval. During a pain I allow the handles of the instrument to go as far apart as they will, just taking care it does not slip out—of which indeed there is not much fear. During each interval I make one or two, or perhaps three, gentle attempts at traction, usually with one hand only, and after each effort I allow the handles to separate widely. The forceps used in this way in cases of uncomplicated labour occasion practically hardly any pain, and I do not, as a rule, give chloroform. They may be used in this manner for a considerable time, if necessary, without fear of indenting the head or injuring the mother. When the head is presenting at the vulva, and the pains are still strong, it is sometimes well not only to use traction during a pain, but even gently to hold the head back with the forceps, and then, when the perinæum seems sufficiently dilated, to extract during an interval. (Dr. H. Lowndes, p. 356.)

Displacements of the Womb and Dysmenorrhœa. — *Pessaries, &c.*—Speaking of pessaries and other instrumental interferences Dr. Savage said the instrumentalists deceived themselves lamentably. What they contended for was that their inventions cured in some cases, relieved in most, and never did harm, whereas there was abundant evidence that they never cured, relieved only so long as they were used, and too often did much harm, even to compromising the life of their patients. An eminent provincial surgeon had only lately brought to the notice of the profession fourteen morbid specimens. He said they were the uterine appendages, some of the tubes containing half a pint of matter. It was also alleged that these unfortunate subjects had been the *round* of the profession, and had been submitted to all sorts of instrumental treatment. They did not begin by having half a pint of matter in their Fallopian tubes. Was it not clear that the original disease if not produced by instrumentation had been greatly aggravated by it? and why call gastrotomy laparotomy, which no one could attempt without speedily finding himself in the hands of the coroner? and why salpinx, when the tube was not like it? Instrumentalists spoke doubtlessly in good faith, but could anyone who reckoned his cases by the hundred be sure of their ultimate fate? Dr. Savage's opinions were at one with those of Dr. Herman and Dr. Hicks. You meet with every sort of uterine deviation and contraction without suffering, and the converse, and as to Dr. Herman's diagnosis so much cavilled at, it was more likely to be right than that by instrumentation. The uterus readily took the form and direction of the instrument introduced into it; by losing sight of the anatomy of the broad ligament, the side attachments of which were behind the cross diameter of the pelvis, instrumentalists ceased to comprehend the *rationale* of their surgical treatment. He would undertake to manufacture to order any uterine deviation by the help of this instrumentation now in vogue. He deprecated the fast growing tendency to interfere surgically with every complaint referable to the uterine system. He agreed entirely with foregoing speakers that instrumental interference should never be resorted to till after general treatment, so successful in former times, had been fairly tried. (Dr. Savage, Obstetrical Transactions, 1883, p. 10.)

Examinations and Operations in the Pelvic Organs.—*Swan's Incandescent Carbon Lamp.*—Dr. Aveling exhibited to the Obstetrical Society a modification of Swan's incandescent carbon lamp carried out by Mr. Stevenson and sold by Mr. Coxeter. The lamp is not much larger than an almond, and having a glass jacket the heat from it is never very intense.

Fixed on a long stem it may be passed into cavities for operative or endoscopic purposes. Dr. Aveling thought it would be of great service to the gynæcologist, not only in examinations and operations of the pelvic organs, but also in cases of abdominal section, where light was required in any deep part where the daylight could not reach. (Dr. Aveling, Ibid, p. 304.)

FLOODING.—*Hypodermic Injection of Ergotinine.*—A quick, steady, and permanent contraction of the uterus is a condition *sine qua non* for checking uterine hemorrhage after delivery. This can be obtained by hypodermic injections of ergotinine. What is ergotinine, and how does it differ from ergotine? Ergotinine is the alkaloid of the ergot of rye, as quinine is the alkaloid of quinquinia or morphia that of opium, while under the name of ergotine are known different products of ergot—that of Bonjean, Yoon, Wigger, Wenzell, and the extract of ergot of the B.P., these are simple extracts of ergot of rye. It was discovered by Charles Tauret, the distinguished chemist, of Paris, in the year 1875, and the name "ergotinine" was given by him in order to distinguish it from the ergotine. In order to show the extreme force and powerful effect of this alkaloid, I will only say that one pound of the fresh powder of the ergot of rye gives only three grains of the crystallised alkaloid. The alkaloid of ergot must be used in every case of post partum hemorrhage due to the absence of uterine contractions, or when after a good contraction there is a relaxation of the organ. Naturally, when there is a retained placenta this must be first removed, and if the hemorrhage does not cease the ergotinine may be used hypodermically. Inject ten minims of the solution of ergotinine (containing only $\frac{1}{200}$ of the alkaloid), in the gluteal region. Dr. C. Chahbazain, p. 362.)

Ether in Collapse from Flooding.—I used ether eighteen months ago in a severe case of flooding caused by placenta prævia, the particulars of which I append. I received a message from a fellow practitioner who was ill, asking me to attend a midwifery case for him. On arriving at the house, bag in hand, I found the woman on the bed in such a state that for a moment or two it was doubtful whether she was alive or dead. However, she was alive, and I immediately injected half a drachm of ether. Its effect was magical, so I gave another injection of the same quantity. After this ether and Bonjean's ergotin were injected together into the buttock: this produced contraction of the uterus, and brought the head down to close the os, where it was maintained in position by abdominal pressure. Shortly afterwards I turned and delivered, and the woman made an excellent and rapid recovery. (Mr. H. H. Meyers, Lancet, Sept. 1, p. 388.)

Extirpation of the Uterus for Malignant Disease.—The patient is anæsthetised, and placed in the lithotomy position, with the buttocks well raised and projecting over the edge of the table, and the pelvis well flexed upon the abdomen. The perinæum is then retracted, and the diseased cervix brought into view. It is seized with vulsellum-forceps, and dragged downwards and forwards, so as to expose the posterior reflexion of cervico-vaginal mucous membrane. With a scalpel, a semi-circular incision is carried round through the healthy membrane, at as great a distance as possible from the infiltrated diseased margin. With the handle of the knife and the finger, the posterior surface of the cervix is to be denuded of its coverings, mucous membrane and peritoneum, as high as is necessary. This done, the cervix is next to be depressed backwards, and an anterior semicircular incision made, and the uterus detached from the bladder. The lower margins and insertions of the broad ligaments, with the uterus, can now be felt by the fingers, and the pulsation of the uterine arteries detected. A curved needle is now passed, as high as can be reached, through the ligaments on each side, and the vessels ligatured about half an inch from the uterus. With a pair of scissors, the ligaments are now severed midway between the ligatures and the uterus. The latter is then still more dragged upon, and the cervix is severed with the knife from before backwards, care being taken to grasp the anterior part of the cervix or uterus stump, left behind, by a vulsellum-forceps. The excision is then completed and the removed portion examined, to see if the whole of the disease has been included. The stump and flaps are now washed with iodised water; a sound is passed, *in utero*, as a guide, and the flaps of mucous membrane are brought together by four or five sutures, one or more on each side being passed through the stump of the uterus. The uterus is then steadied by the vulsellum forceps, and the vagina plugged with pledgets of cotton soaked in dilute acetic acid. The vulsellum is then fixed outside the vulva, so as to keep up pressure upon the vaginal plug. In some cases, where there was difficulty in passing the ligature round the uterine arteries in the broad ligaments or in securing the vessels and controlling hemorrhage, I have clamped both with Spencer Wells's forceps, and left them *in situ* for thirty-six or forty-eight hours. The forceps lie in the outer angles of the flap-line of sutures—the latter adjusting in apposition the flaps of vaginal mucous membrane (Dr. J. Wallace, p. 380.)

Hot-Water Enemata in Delivery.—The value of hot-wate enemata as a means of hastening delivery, apart from its us in the removal of fæcal accumulation, in such cases of tedi ous labour in which either ergot or the forceps are admissible, has been hitherto unaccountably ignored in practice, as far as my experience extends. I formerly had warm-water enemata given with the usual object of removing fæcal obstruction from the rectum; in most cases, an increased rate of dilatation of the os followed. Latterly, I have had enemata of hot, not merely warm, water administered, whether there were any appreciable collection of fæces or not, and always with the result of an accelerated rate in the progress of labour. The fact of the os dilating under the influence of the enema, whether there were an appreciable quantity of fæces or not in the rectum, proves that their presence does not prevent dilatation by causing spasm; at least, not in the majority of cases. It follows that the hot enema must act as a direct and powerful stimulant to the uterine muscle, and I feel convinced, I may add, as a result of close observation, also to the voluntary muscles engaged in the act of parturition. Judging from the sense of relief which follows its administration, it has, at the same time, a relaxing and soothing effect on these same parts; analogous, in short, to the effect of hot water applied in the familiar form of a fomentation to an inflamed and painful swelling. I believe I am justified in adding that there is less atony of the uterus after delivery, when a hot enema has been given, and consequently less tendency to *post partum* hemorrhage. On this account, it has not the after-relapsing effect of chloroform on the uterus it otherwise commonly has. I submit that it would be as well to give so simple a means of treatment as hot-water enemata a trial, in cases in which either ergot or the forceps would be used, as it possesses obvious advantages over both. (Dr. D. L. Beckingsale, Chiswick, Brit. Med. Journal, July 14, p. 69.)

The remarks of Dr. Beckingsale on the value of hot-water enemata in delivery, I can fully endorse. The stimulant effect of hot water on the uterine tissue, though slowly gaining ground, seems to be far from generally appreciated by the profession, far less than, from its efficiency, it deserves. I refer not only to rectal enemata, but also to vaginal and uterine injections. Indeed, I believe the beneficial effect of hot water is more readily obtained by injection *per vaginam* than *per rectum.* That such should be the case in rigidity of the os is evident; and unless fæces be present in the rectum, I give preference to vaginal injection, as being the more efficacious of the two. In *post partum* hemorrhage from inertia of the uterus, no remedy is more certain and speedy in its action; so much so, indeed, that it is a matter of surprise it should not be more generally adopted. The following case served, perhaps, more than any, to impress upon me its superiority over the means in more general use. After removing a morbidly adherent placenta under chloroform, the uterus failed to contract, and, while waiting for hot water, the hand was retained in the cavity of the uterus; suprapubic pressure, with friction of the abdomen, flipping with a wet towel, all produced the same effect—local contraction of the uterus, answering to the surface of the abdomen affected, but nothing more. The administration of ergot, owing to the persistence of anæsthesia, was inadmissible. On injecting hot water, however, a general contraction took place, expelling the retained hand almost immediately, and the hemorrhage forthwith ceased. As the objections which have been urged against uterine injection may be obviated, and all risk reduced to a minimum by a careful performance of the operation, the following details may be found useful. First with regard to the necessary apparatus, a Higginson's syringe (those made in one piece are the best) and uterine tube, furnish all that is required. From the obvious risk of lacerating the uterine tissues (one fatal case in which the tube found its way between a portion of retained placenta and the uterine wall having occurred to my knowledge), the leaden tube may, with advantage, be dispensed with, and a perfectly harmless substitute improvised by adding two or three more eyes to a No. 12 flexible India-rubber catheter. This can be readily adjusted to the nozzle of the syringe, and the whole packed in a small compass. Being firmly convinced that all manipulations within the uterus should be conducted antiseptically, as a prophylactic measure totally apart from its curative influence in cases of intra-uterine decomposition, I invariably add Condy's fluid to the water injected. This may be carried in the form of powdered crystals of permanganate of potash, and added to the water as required, the strength (insufficient to stain the finger-nail) being readily gauged by the tint of the solution. This antiseptic being inodourless, nonpoisonous, readily portable, comparatively inexpensive, and losing its red tint, if slowly injected, only so long as there is decomposing matter in contact with it, is so suitable, that I need mention none other. The water should be of such temperature that the finger can be retained in it without producing pain. The patient being brought into a good obstetric position, the trunk across the bed, with the buttocks well to the edge and the knees drawn up, the catheter and syringe being first filled with water, the tube can be readily passed in the following way. The point of the catheter should be taken between the tips of the first and second fingers of the left hand, and inserted into the vagina. Before proceeding further, the vagina should be flushed; the fingers then carried up to the os, acting as a guide to the point, the stem of the catheter, running along the cleft of the fingers and palm, is readily pushed onwards into the uterus. The injection, like all other intra-uterine manipulations, should be slowly performed, and the catheter moved from time to time, to bring the fluid injected into contact with all parts of the uterine cavity. Care should be taken, by keeping the end of the syringe beneath the water, to avoid the introduction of air. A siphon arrangement, made from a length of tubing, with spring clamp to regulate the flow from an elevated vessel, has been recommended in place of the syringe. (Dr. Robert Boxall, Cranleigh, Brit. Med. Journal, July 21, p. 115.)

MENORRHAGIA.—*Cannabis Indica.*—My experience of Indian hemp confirms Mr. Oliver's in some particulars, especially its physiological action. In no case has it produced pleasurable feelings, generally most alarming symptoms, such as complete paralysis, horrible hallucinations, double consciousness, &c. A young practitioner should be most careful in prescribing, and warn patients of its action, or he may lose their confidence. Indian hemp has been vaunted as an anodyne and hypnotic, having the good qualities of opium without its evils. Also in dysmenorrhœa. In this complaint and insomnia it has not proved of much benefit. The drug has almost invariably produced some marked physiological effect even in small doses. Text-books give the dose as ten minims and upwards, but five minims is the largest dose that should be given at first. If bought from a good house, the drug is not inert or unreliable. A drug having such marked physiological action ought to have a specific use as a therapeutic agent. Indian hemp has such specific use in menorrhagia—there is no medicine which has given such good results; for this reason, it ought to take the first place as a remedy in menorrhagia, then bromide of potassium and other drugs. The *modus operandi* I cannot explain, unless it be that it diverts a larger proportion of blood to the brain, and lessens the muscular force of the heart. A few doses are sufficient; the following is the prescription: ℞. Tincturæ cannabis indicæ ♏xxx; pulveris tragac. co. ʒj; spiritus chlorof. ʒj: aquam ad ℥ij. One ounce every three hours. Four years ago I was called to see Mrs. W., aged 40, multipara. She had suffered from menorrhagia for several months. Her medical attendant had tried the ordinary remedies without success. Indian hemp was given as above. Its action was speedy and certain. Only one bottle was taken. She was afterwards treated for anæmia, due to loss of blood. Twelve months after this my patient sent for a bottle of the "green medicine." I learnt afterwards that she had sent this medicine to a lady friend, who had been unsuccessfully treated by another medical man for several months for the same complaint. It proved equally successful. The failures are so few, that I venture to call it a specific in menorrhagia. The drug deserves a trial. It may occasionally fail; this, however, is not to be wondered at in a complaint due to so many different causes, and associated with anæmia and other cases of plethora. (Mr. John Brown, Bacup, Brit. Med. Journal. May 26, p. 1002.)

Metria, or Puerperal Fever.—The two ordinary forms of puerperal septicæmia are preventable, It is evident that, with thorough cleanliness, and the use of antiseptic precautions, septic poison should never be introduced into the patient's system by the attendants; further, I believe that i- is possible to prevent self-infection in a healthy woman, by adopting precautions to insure a good and permanent contraction of the uterus, and by washing out the uterus whenever we have reason to suspect the existence of clots, &c., in it, with a disinfecting fluid. With the former object, I make it a practice to put all patients in whom a relaxed condition of the uterus exists, on ergot, from the moment labour terminates, continuing its administration for at least a week. I believe a relaxed condition of the uterus to be a very common predisposing cause of self-infection in puerperal women; it favours the formation of clots *in utero*, and also, the orifices of the uterine sinuses being left open, the absorption of septic matter is favoured. In proof that I do not exaggerate the importance of imperfect contraction of the uterus, as a main factor in the production of puerperal septicæmia, I may point out that I recently saw, in consultation, three patients suffering from this affection, in all of whom labour had been so rapid that the child was born before the arrival of the medical attendant; and it is a well-known fact, that relaxation of the uterus is very liable to follow the too rapid emptying of that organ. This train of reasoning has led me to believe that imperfect uterine contraction is one of the causes of the frequent occurrence of septicæmia in unmarried women. The mortality from septicæmia amongst them is very great, and there is no doubt but that the great mental distress these poor creatures suffer, interferes with the recuperative process which should take place rapidly in the uterus after parturition. The muscular fibres of the organ do not contract as they should; the blood supply, consequently, is not cut off, the mouths of the sinuses remain open, the denuded placental site, instead of becoming rapidly restored to its normal condition, becomes unhealthy, and the fœtid discharge which, under these circumstances, takes the place of the normal lochia, enters the system, either directly through the open mouths of the placental sinuses, or is absorbed at the site of some fissure in the mucous membrane lining the genital track. This is one form of puerperal septicæmia which I fear is beyond the reach of preventive treatment. No antiseptic precautions can prevent its occurrence, no treatment that I know of will stay its progress. In patients suffering from certain forms of chronic disease a similar condition is observed, and similar results follow. In my opinion, the infection arising from any of the forms of metria to which I have alluded, cannot be carried by the attendants from one patient to another, if precautions be adopted to prevent it. And only a year ago I was strongly inclined to believe that epidemics of so-called puerperal fever would not occur so long as such precautions were adopted. Those enforced by me among the pupils attending the Rotunda Hospital were the following. 1. Students attending the practice of the hospital should not undertake *post mortem* examinations, be engaged in dissections, or attend an hospital containing patients suffering from infectious diseases; and 2. Before proceeding to examine any patients, they washed their hands in a solution of carbolic acid. (Dr. Lombe Atthill, p. 367.)

The form of puerperal fever now most frequently met with is distinctly remittent in its type. Several cases of this kind have come under my observation in which the fever was of the tertian character. Still more usually, however, there are daily matutinal remissions. Thus the temperature and pulse in the second week of the illness often fall each morning to little above normal, and again rise throughout the afternoon, until in the evening the former has reached 105°, and at the same time the pulse becomes above 120. In the treatment of the remittent forms of puerperal septicæmia, our main reliance must be placed in quinine. This should be given in medium doses of from three to four grains at short intervals of three to four hours, and continued until the pulse and temperature have been sufficiently reduced, and cinchonism has been maintained for some days. I may here repeat that, with very few exceptions, all the cases of puerperal fever I have recently seen were of an essentially asthenic type, presenting all the symptoms of so-called malignant puerperal fever or septicæmia, and, consequently, were not suitable cases for any form of depletion; but, on the contrary, required the free use of stimulants and nutriment. Whatever other treatment may be indicated, however, the use, twice daily, of warm antiseptic intra-uterine and vaginal injections is essential in every case of puerperal septicæmia. The use of such injections, for the purpose of thoroughly washing out septic exudations from the cavity of the uterus, is self-evident. But, at the same time, it should be said that they require to be used with far more caution than is generally practised. Nor should we ever fail to impress on the nurse, in such cases, the risk of probably injecting virus into the open uterine sinuses; or, on the other hand, of forcing the injected fluid through the patulous Fallopian tubes. I have more than once seen injury caused, in both these ways, by want of such caution in the use of the ordinary siphon syringe. (Dr. T. More Madden, p. 371.)

Sponges Aseptic in the Vagina. — Dr. Matthews Duncan calls attention to a valuable means of keeping sponges, tents, instruments, &c., aseptic in the vagina. It had been suggested to him by Dr. Alexander Ogston, of Aberdeen, and he had used it with success in inducing premature labour and other operations. It consisted in anointing instruments, and in soaking sponges or lint with a cream of salicylic acid. This cream was the powdered acid moistened with glycerine or vaseline; about 1 of the acid to 4 or 5 of the vehicle. (Obstetrical Transactions, 1883, p. 5.)

ANÆSTHESIA.

Administration of Anæsthetics.—I have observed that those who administer anæsthetics too often do so without any fixed principles to guide them. This is lamentable, because, as many of these cases show, the fundamental laws of the anæsthetic art cannot be disregarded without entailing a deplorable sacrifice of life. I will here endeavour to state, in the briefest manner possible, what I consider to be the most important practical inferences to be drawn from them. With regard to chloroform, then, subject to the attainment of the object in view, too much air cannot be given during its administration; and with regard to ether, too little air cannot be given during its administration. From this it follows, that a long time is required to induce anæsthesia by chloroform; but to produce the same result with ether, a short time is sufficient. Now, by a long time, I mean about a quarter of an hour, and by a short time, about five minutes. Surgeons are not unfrequently to blame in this respect. How often one has heard it said to the chloroformist—"Be as quick as you can; I want to begin the operation in *five minutes*." In my opinion, this is equivalent to saying—"Kill at least 1 per cent. of my patients." Those inhalers are the best which most readily facilitate the fulfilment of these requirements. For giving chloroform, one with a wire framework, having a diaphragm of flannel, or some similar material, stretched over the top of it, on which to evaporate the anæsthetic, but open at the sides, would be very good; but a piece of lint, or the corner of a towel, properly used, would do as well. A graduated drop-bottle is necessary in any case, as only a small quantity of chloroform should be poured on at a time, and this requires to be frequently renewed. For the administration of ether, Ormsby's inhaler seems to me the best; it was designed to fulfil the requirements just mentioned, and I have found it answer admirably. There is only one point I will now mention, and that is the importance of watching the respirations during the process. To do so properly, of course the epigastrium must be uncovered. It is of much greater value than feeling the pulse, since, when the latter stops, there, as a rule, is an end of the patient. Mr. Lister has very ably insisted on this. However, I have found it generally neglected at King's College Hospital. (Mr. W. Roger Williams, *Retrospect*, vol. 87, p. 405.)

Safe Administration of Chloroform, and of Bichloride of Methylene.—By putting into Snow's inhaler, modified by Matthews Brothers, first five minims of chloroform, then in twenty seconds ten minims, in forty seconds fifteen minims, and the latter quantity every minute, I produced complete insensibility to pain with a total quantity varying from twenty minims to seventy-five, with, I believed, perfect safety, and with a great diminution of the struggling and subsequent after-nausea and vomiting. I have found the best means of remedying the struggling or failure of the pulse in the introduction of thirty minims of pure ether by the same inhaler (*Retrospect*, vol 87, p. 412). I have since then both in private and hospital practice, administered the bichloride of methylene with the same apparatus, but without the hot water between the compartment containing the anæsthetic and the outer jacket of the instrument, with the following most satisfactory results. In almost every case the bichloride of methylene was as efficient in the same small doses as an anæsthetic as chlorofrom. The heart's action in no case failed in the slightest degree, the struggling was less violent, and the after-nausea and vomiting were very much less troublesome. The struggling ceased on administering through the inhaler thirty minims of ether. The absence of failure of the heart has been mentioned in this mode of giving small but efficient doses of this agent, as also the great comparative absence of nausea and vomiting. I have observed that the patients under bichloride of methylene became much sooner conscious when the inhalation was discontinued than under chloroform.

In this lies the comparative safety and weakness of the bichloride of methylene. It does not in some cases abolish so completely the reflex functions as does chloroform, and in two cases of operations on the rectum, where the reflex action is so easily excited, fifteen minims of chloroform were substituted for the methylene, with immediate advantage. For the same reason I can conceive that in delicate operations on the eye or its appendages chloroform would be better than the bichloride of methylene. (Mr. W. M. Coates, p. 409.)

Chloroform Syncope.—In an otherwise good paper by Mr. S. Osborn, Chloroformist to St. Thomas's Hospital, I find these words, "Inversion of the body should be always tried if stoppage of the heart's action occur. The head being lowered and the legs elevated, the blood is sent to the upper part of the body." Of course it can only be the blood in the veins of the lower part which can be so passed to the upper part of the body, and everyone knows that it must pass first through the right side of the heart, and then through the lungs, before it can be sent to the upper part of the body. But the evil against which we are supposed to be contending is that there is too much blood already in the right side of the heart and lungs, and that it cannot get on. To send more venous blood to these organs just then is surely to aggravate the mischief, especially where the heart's force is greatly diminished, and the respiration is inefficiently performed. Even although the latter function be carried on artificially it cannot be sufficient of itself to renew the pulmonary circulation while the heart remains feeble, and one great cause of its continuing feeble is the weight and paralysing influence of engorgement of its right cavities. It seems to me, then, that this inversion of the body has been recommended in these cases without due consideration, and that it is not suitable to them. If, in spite of the valves in the veins, the venous blood from the neck and arms did get to the brain by depressing the head and neck, as is sometimes done, it could only deepen the coma and increase the evil from the side of the nerve centres; and, as I have shown, the venous blood from the lower part of the body, if forced upon that already filling the right side of the heart and lungs, could only embarrass the circulation, and still farther add to the danger of the patient. The best position for such patients, as for all in syncope, is the horizontal position, because in it a feeble heart has least hindrance to its work in sending, not venous blood to the lungs, but arterial blood, both to its own substance and to the brain. No doubt these two results of cardiac action take place simultaneously, but it is on the latter—viz., the sending forth of arterial blood, that our hopes for the patient mainly depend, and the importance of artificial respiration in assisting this is obvious to all who rightly consider the matter. The *horizontal position*, along with artificial respiration, is that which favours most the reinforcement of the heart, and this is the one object of hope in all such cases. But the practice of inversion of the body has been so constantly recommended that no one at present thinks he does his duty to his patient unless he has recourse to it, and I believe some operating tables are now made with a lever so as to enable the surgeon readily to invert the table and the patient upon it. Now this, I submit, is both an unnecessary complication of the table and a practice really hurtful to the patient, because in so far as it succeeds in sending venous blood of the lower part of the body to the heart it tends to embarrass and weaken that organ, already labouring under influences formerly explained, against which the best remedy actually is to diminish the blood, which stagnates in the right heart and lungs; and this we attempt to do by artificial respiration with the patient in the horizontal position more physiologically, and therefore more hopefully, than by inversion. (Dr. Eben. Watson, *Retrospect*, vol. 87, p. 415.)

Treatment of Symptoms indicating Danger in the Anæsthetic State.—The anæsthetic state is a condition of danger. It means the suspension of the functions of animal life, the organic functions, especially respiration and circulation, continuing. This primal fact, then, indicates the danger to be provided against, *cæteris paribus*. Chloroform endangers the circulation, ether the respiration. Sometimes, however, chloroform paralyses the respiratory centre, rarely ether paralyses the heart. The treatment, therefore (disregarding exceptional conditions), resolves itself into the administration of remedies to prevent or relieve the tendency to cardiac paralysis on the one hand, or to respiratory failure on the other. The *first prophylactic* is the relinquishment of chloroform altogether—there are a few instances where it however has an advantage over ether, viz., in operations to be performed by candle-light, in which ether may form an explosive material and cause danger; also in obstetrics to assuage the pains of labour, and in various obstetric operations. In most other cases ether should be used. The *second prophylactic* is the use of morphine hypodermically—before the inhaling has commenced, according to Bernard—when analgesia has been produced, according to Nussbaum. Bernard's method seems to be the better, because the effect of morphine prevents the sudden failure of the heart, sometimes induced by a few whiffs of chloroform vapour, facilitates the inhalation by lessening the irritation of the air-passages, and diminishes or prevents the stage of tetanic rigidity, with its stertorous breathing and cyanosis. It is important to ascertain the condition of the patient. The habits of life, the absence of cerebral, of pulmonary, and of cardiac diseases of a nature contra-indicating anæsthetics, and this should not be founded on a mere superficial examination of the chest, but by a thorough investigation of the life history in its pathological aspects as well as a minute study of the somatic state of the time. The quickest mode of dying is by arrest of the heart's action; unfortunately in a large number of cases the heart is incapable of further action when its embarrassment is ascertained, and hence the wisest measures may be futile. Digitalis has been employed subcutaneously, but if this drug acts rapidly enough to affect the circulation, the result must be disastrous, since it induces such a rise in the arterial tension as to impose additional work on the heart. A remedy acting in the opposite way—to lower the tension at the periphery, and thus diminish the resistance to the propelling power of the heart—seems *à priori* to be more suitable, and experience confirms this theoretical view. Amyl nitrite used hypodermically has been of immense service in cases of threatened cardiac paralysis. From 3 to 5 minims under the skin at any point, or if respiration is going on, the effect is more speedily procured by inhalation. The intra-venous injection of ammonia is also a promising expedient to arouse the heart. Atropine has also the power of increasing the heart's power. As a rule, however, it is better to administer atropine with morphine before beginning the inhalation of the anæsthetic vapour. Acupuncture and electro-puncture of the heart have been suggested, but they are rather injurious than beneficial. So much for cardiac failure. In respiratory failure (the chief danger in ether inhalation) the respiratory centre should be supplied with blood as quickly as possible. Nélaton's method of inverting the body accomplishes this. The tongue falling back in the throat forces down the epiglottis, hence to draw out the tongue is a most necessary expedient for freeing the entrance to the larynx. It accomplishes more, however, for the strong traction on the basal attachments of the tongue, exerts a reflex effect on the respiratory centre, and this, according to some, is the chief use of the practical faradisation of the chest muscles. Inhalation of ammonia, irritation of the Schneiderian mucous membrane, are the means resorted to, for reflex stimulation of the respiratory centre. Dashing cold water over the chest exposed to a draught from an open window is a doubtful measure, which, of little use at the time, is apt to be followed by bronchitis or pneumonia. Certain stimulants to the respiratory centre may be employed—*e.g.* atropine and strychnine subcutaneously; alcoholic stimulants are of doubtful utility, though apparently beneficial in some cases. As chloroform and ether are derivatives of alcohol it seems to be irrational to use it as an antidote for depression caused by these anæsthetics; but the counter-irritant effect of the injection may have a favourable influence. (Philadelphia Med. News; Dublin Journal, April, p. 382.)

Bromide of Ethyl for Short Operations.—The action of bromide of ethyl is very evanescent, and on that account it can never take the place of chloroform or ether for surgical operations which require any prolonged anæsthesia; but for all operations that can be performed in one or two minutes the use of this agent leaves nothing to be desired. Dr. J. J. Chisholm, in the Med. News for Jan. 27th, says that one drachm of the bromide of ethyl will put any patient into deep narcosis in less than a minute. This sleep will not last more than one or two minutes; the patient awakes from it suddenly, as if from ordinary sleep, with brain as clear as before the inhalation, and with neither nausea, headache, or heaviness of any kind. These effects, however, must be obtained from the first inhalatien or primary anæsthesia; repeated doses of it during an operation cause the same unpleasant symptoms that chloroform or ether does, and thus the ethyl loses all its advantages. The surgeon should have everything in readiness, and must be methodical in order to use successfully and take advantage of this evanescent narcosis. To ethylise efficiently a saturated vapour must be used, and the inhaler must not be taken from the patient's face once the apparatus has been put over the nose and mouth. It needs confidence in the safety of the anæsthetic to push it in its concentrated form, but in no other way can the best effects of a primary anæsthesia be produced. Dr. Chisholm has found it of great use in minor operations about the eyes—such as in passing nasal probes, splitting of the canaliculi, scraping out the contents of tarsal cysts, opening lachrymal abscesses, cutting defective muscles in squint, removing the elliptical piece of skin of the lid in ptosis or entropion, performing iridectomies for glaucoma, or for making of artificial pupils, or for optico-ciliary neurotomy. In dental practice it would seem to be of great service. (Dublin Journal of Med. Science, April, p. 335.)

Junker's Anæsthetic Apparatus. — [A detailed description and woodcut of this apparatus, by which an anæsthetic is not only administered economically, but also in regulated dilution, is given at page 412.]

Modification of Junker's Apparatus.—The use of a gum-elastic catheter or leaden tube has, in many cases, a great advantage over the soft connecting tube belonging to Dr. Junker's apparatus. I add a few details in connection with its employment, which, with a now considerable experience, appear to be worth noting, and which I hope may be of service to others to whom the apparatus is not familiar. In some cases, having got the patient under the influence of chloroform, I have maintained the anæsthesia by introducing the elastic tube, which connects the mask with the bottle holding the anæsthetic fluid, through the nostril to the pharynx; but my reasons for preferring a gum-elastic catheter in these cases are, first, on account of its more easy introduction; second, because, as that part which remains out of the nostril is sometimes subjected during the operation to pressure or bending, it is necessary to employ an instrument which, unlike the connecting tube, cannot easily be rendered impervious. But there are some cases in which the introduction of a tube through either of the nostrils is impossible, as when they are blocked by tumour; and there are other cases, such as cleft palate, in which it is undesirable. If anæsthesia is to be maintained throughout these operations, the vapour must be conducted through the mouth; and though it is quite possible to do so with the connecting tube, it may be far more advantageously done by a gum-elastic catheter or flexible metallic tube; for the connecting tube, being very limp, can only be kept in position by the administrator's hand being placed near the mouth, and even then it is liable to be displaced from the mouth every time the blood is sponged out; whereas the gum-elastic catheter, or the flexible metallic tube, being nine or ten inches long, can be held in place from a distance. This is important, because in these operations the surgeon requires all available space in front of the patient's face. I at first used, in all cases of operation on the mouth, a No. 8 gum-elastic catheter open at both ends, which answers very well when inserted into the nostril, but when used for the mouth, I found that, becoming warm, it would not retain the curve I desired, aud this led me to employ a leaden tube. When giving the vapour by the nostril, I use a gum-elastic catheter of the largest size that can be conveniently introduced, and do not pass it beyond the edge of the soft palate. For giving the vapour by the mouth I use what is called a "flexible metallic catheter," No. 12, with both ends cut off, and hold it in the mouth about on a level with the wisdom-teeth. (Mr. Joseph Mills, Administrator of Anæsthetics to St. Bartholomew's Hospital, British Medical Journal, May 19, p. 969.)

Dr. Ernest Clarke raises an objection to my anæsthetic apparatus, that it is impossible to feel the pulse without the aid of a third hand. I, and many who use the apparatus, succeed in managing it, even with only one hand. It requires very little practice to hold the mask, and, by pressing the balloon against it, to squeeze it with four fingers without hurting the patient's face, whilst the little finger is placed on the facial artery, being thus easily enabled to count the pulse and estimate the rhythm. As regards Mr. Mills's modification, I beg to state that Prof. Rose, of the Bethania Hospital, Berlin, mentions in a pamphlet on operations on the face and oral cavity with reclined head (to prevent the inspiration of blood), published in 1878, that it was only owing to this apparatus, that he was able to perform the operation under continued deep narcosis by chloroform. After rendering the patient insensible in the usual manner, he removes the mask, and introduces the elastic tube which connects the mask with the bottle holding the anæsthetic fluid, deeply into the nostril (without the use of an elastic catheter or flexible leaden tube). Prof. Rose brought the subject before the Annual Surgical Congress, held at Berlin, two or three years ago. Since then, this has been generally adopted on the Continent in similar operations. (Dr. F. Junker, Brit. Med. Journal, May 12, p. 917.)

The Dublin Inhaler.—Since 1876, in all cases where an anæsthetic was administered, I have used the Dublin inhaler, and find it equally applicable whether chloroform, ethidene, or ether be employed. The inhaler consists of two pieces of thick wire, 13 inches in length, nickel plated, bent into an oval form, and united by a series of wires 3 inches in length, which must be firmly soldered to resist the action of the fluid used, and be separated an inch from each other. Through this framework a bandage is passed backwards and forwards, and a firm piece of india-rubber surrounds the frame, passing beyond it for two inches at one side. The chloroform is poured on the bandage, and while the patient inhales a greater amount of chloroform than when using the ordinary towel or flannel inhaler, still there is a sufficient amount of air to ensure safety. The advantages of this inhaler are:—1. The small amount of chloroform which is required to produce anæsthesia and to keep it up. 2. The rapidity with which patients become anæsthetized with it. From 2 to 3 minutes has been the average, and never more than five or seven. The same patient will take 3 minutes with the inhaler, and often 20 with the ordinary towel. This I have noted several times, and patients have told me that they could not be put under chloroform on former occasions, but the inhaler produced complete insensibility in three or four minutes. 3. Economy both in chloroform and time, and with, I am inclined to think, increased safety to the patient, who inhales much less of the poison and avoids the cumulative effect. Instead of operations occupying an hour with the delay iu bringing the patient under the influence of the anæsthetic and a further detention in coming out of it, complete anæsthesia is rapidly produced and as rapidly passes off. (Dr. J. Crawford Renton, Glasgow Med. Journal, Sept. p. 173.)

Analgesia by a New Method.—Prof. Brown-Séquard has found a very simple means by which he can produce a prolonged insensibility to pain without any deprivation of cerebral functions, without any damage to the sense of touch in any part of the skin or of the special senses, and without any alteration of the force, regularity, or appropriateness of the voluntary movements. He has also observed that wounds made while the animals (monkeys and others) are in this state of analgesia do not cause pain till they heal. These are really wonderful things. But up to the present the method has not been applied to man. If Brown-Séquard is only able to carry this out, we think everyone will admit that something of practical importance and utility has resulted, even in these days, from the practice of vivisection. The object of his experiments was to show that by irritating the upper part of the larynx with carbonic acid a considerable amount of anæsthesia was produced, not only locally but generally, and that the latter result was due not to the passage of the gas into the blood, but to the influence exercised on the nervous centres by the irritation of the sensitive nerves of the larynx. The same results were obtained in the same way with chloroform, ingress into the lungs having been in both cases prevented by certain precautionary measures. The anæsthesia thus produced lasts much longer than that by inhalation. In the monkey it lasts at least twenty-four hours, but Prof. Brown-Séquard wished to ascertain whether the anæsthesia would last still longer. The subject of his experiments had been operated on three days previously, but he found that sensation had already returned. The importance of this discovery cannot be over-rated, as by its means patients may be rendered insensible to pain not only during an operation, but for at least twenty-four hours after, whereas by the ordinary mode of inhalation of chloroform there is not only immediate return of sensation after its effects have passed off, but a certain amount of hyperæsthesia is produced in the parts operated on. In another series of experiments, Prof. Brown-Sequard obtained the following results:—1. When carbonic acid was applied to the superior laryngeal nerves, both being intact, anæsthesia was produced on both sides of the body. 2. When one of the nerves was cut anæsthesia was produced, but principally on one side of the body. 3. When both the nerves were divided there was no anæsthesia on either side. The professor thinks that it is by inhibition of the activity of the central nerves of sensation that the peripheric irritation of these nerves acts in producing anæsthesia. The mechanism of this phenomenon is analogous to what this eminent physiologist found in other experiments, in which the injection of carbonic acid on the mucous membrane of the larynx arrested by inhibition the morbid activity of certain parts of the nervous centres, and thus cut short attacks of epilepsy, or temporarily suspended or diminished the convulsions caused by strychnine or by carbolic acid. (Dr. Brown-Séquard, Lancet, June 16, and Sept. 22, pp. 1071, 512.)

LOCAL ANÆSTHESIA.—*Anæsthetic Mixtures for Small Operations.* —It is often desirable to apply locally some anæsthetic material to deaden the sensibility sufficiently for small operations. There are various expedients proposed for this purpose. We do not now refer to the use of ether spray, but to various liquids which may be applied, and the sense of pain so far obtunded as to permit incisions without experiencing any other sensation than the mere touch. The mixture of chloral and camphor is often useful. When equal parts of chloral and camphor are triturated together, a clear, somewhat viscid, transparent solution results. This solution has considerable solvent power, and will take up a comparatively large proportion of morphia. Chloroform may also be added to it without precipitation of any portion of the dissolved constituents. Thus:—℞. Chloral., camphor., āā ʒ ij; morphiæ sulph., ʒ ss; chloroformi, ʒ j.—M. This may be applied with a camel's hair brush over the area to be incised, and allowed to dry, and reapplied as freely as may be necessary to render the part insensible to pain. Amongst the anæsthetic mixtures for surgical purposes proposed by Prof. Redier, are solutions of camphor in ether and in chloroform. According to Redier, one drachm of camphor may be dissolved in two drachms of ether, or the same quantity of camphor in two drachms of chloroform. A useful anæsthetic mixture is prepared by the addition of crystallized acetic acid to chloroform, in the proportion of one part of the acid to twenty parts of chloroform. These anæsthetic solutions are applied by the brush freely over the part the seat of pain, or to be incised. In some instances it may be better to moisten a cloth or some cotton and allow it to remain for some time in contact with the part. (Prof. Redier, Glasgow Med. Jour., June, p. 477.)

Simple Means of obtaining Local Anæsthesia.—D. Cheize (Journ. de Méd. et de Chir. Prat.) writes that, wishing to remove an ingrowing toe-nail, and being without a spray producer, he covered the toe with a pledget the size of a crown piece, poured ether on it, and evaporated this by means of a pair of bellows; in five minutes anæsthesia was complete and lasted while the nail was removed, and the matrix seared with the actual cautery. (Glasgow Med. Journal, July, p. 74.)

A Method of rendering the Skin insensible.—M. Jules Guérin read a note at the Académie des Sciences upon a method of rendering the skin insensible in those operations which do not admit of chloroform by inhalation, and cited a case in which he had employed it to advantage. A lady, æt. 60, consulted him three months ago for a tumour in the right breast of eight years' standing, which, on examination, proved to be a scirrhus. The general health was bad, bronchial and cardiac troubles were very manifest, and the kidneys were not in a very satisfactory condition. However, the operation was urgent. Chloroform having been considered dangerous, M. Guérin applied around the tumour a circular layer of Vienna paste, limited by a double band of diachylon. At the end of twenty minutes the caustic was removed, leaving in its trace a black ribbon-like line. The knife was then applied, and the tumour removed without the patient feeling the slightest pain, and he did not seem to be aware of the operation. The results were all that could be desired. (Medical Press and Cir., June 27, p. 558.)

PRACTICAL MEDICINE.

DISEASES AFFECTING THE SYSTEM GENERALLY.

ART. 1.—ON THE GERM THEORY OF DISEASE.

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The germ-theory of disease naturally gave rise to the antiseptic theory of treatment, and to the brilliant results which the experiments of Mr. Lister, and his practice, with that of his followers, have brought about, and which have, in the last twenty years, worked so striking a change in surgery. The two theories are so closely connected, that it would seem, at first sight, if one be true, the other must be true also; and no doubt this is so in fact, though it is possible for the antiseptic treatment to show points of failure, or to be proved in a measure unnecessary, without invalidating the germ-theory of disease.

But if we arrive at a point at which it is fully proved that all fermentation is the result of germs; that all septic poison in wounds is produced by germs; that within the body there is no sepsis, and without the body no putrefaction, where germs are excluded; and, finally, that antiseptic treatment prevents putrefaction and septic poisoning,—it would not be unreasonable to conclude that both theories were absolutely true, or rather it would be the height of unreason to come to any other conclusion.

If, on the other hand, it can be shown that germs may exist in wounds without producing evil, and that the antiseptic treatment may be so modified that it is practically abolished, then its opponents have apparent grounds for repudiating the theory in a measure, and for denying its entire validity.

Now, this is just what is happening at the present time. It has been shown that germs may and do exist in wounds without causing sepsis; and splendid results have been obtained in the most formidable surgical operations, where sepsis was formerly the rule rather than the exception, without having recourse to those details which have been insisted on by Professor Lister and his followers as the *sine quâ non* of antiseptic treatment. You will remember that the late Professor von Bruns, after discarding the use of spray, found his cases recover as well under the use of carbolic irrigation; and that he had no deaths from pyæmia or septicæmia.

In ovarian operations, Drs. Keith and Bantock have alleged that the carbolic acid was actually injurious, and have also relinquished the spray as useless and troublesome; and, in the later operations, the mortality has been under 3 per cent.

Mr. Lawson Tait, an uncompromising opponent of the antiseptic treatment, denounces it in most emphatic language, and asserts that, without it, his mortality is not more than 3½ per cent. in cases of ovarian operations. He says: "I have already said enough of the so-called antiseptic system of Lister, to be able to say that it has finally been dismissed from this department of surgery, as having done far more harm than good. I venture to predict a similar fate will meet it everywhere else."

It is probable that the large majority of operators do not carry out the Listerian method in its integrity, and that, in by far the greater number of cases, the degree of antiseptic treatment is, compared with that of Lister, merely nominal; and even Mr. Lister himself now regards the use of spray as of secondary importance.

Then there is the mode of treatment, without antiseptics, by what is called the "dry method," in which no antiseptic treatment is employed, which yields excellent results in giving union by first intention, without any trace of suppuration. In all these cases, there must be a free admission of germs which do not prove hurtful in preventing an aseptic result; and, if this be so, it is not surprising that there should be a tendency to revolt against the exactions of a precise, tedious, and costly method. We have, finally, the statement of Mikulicz: "The original theory on which Lister's treatment of wounds is founded is not absolutely correct. Two remarkable facts stand to controvert this theory: 1. Viable elements of coccobacteria are found beneath carbolic dressings, even in cases which run a faultless course. 2. The Listerian precautions do not by any means suffice to keep out of wounds, or to destroy, the germs, as has been shown by Nägeli and Büchner."

It may not be without advantage, therefore, if I crave your attention and indulgence, while I endeavour to put before you some points, in connection with this subject, which seem to me capable of yielding practical fruit in the explanation of apparent discrepancies. For it must be to us all a most important question, whether facts of this nature assail the germ-theory with any force, or whether there are other modes of accounting for the success of two different lines of treatment; and the question is important for this reason, if for no other, that, if all sepsis be preventable by antiseptic treatment, we are greatly culpable if we allow lives to be sacrificed by our neglect in carrying out the proper method in its entirety.

The theory of fermentation, as at present received, is, as you know, that in all fermentive processes, with the exception of a few which are termed chemical ferments, germs are always present as the originating and maintaining cause; and that, without them, no such change is begun. I need not remind you that these points have been fully established by the experiments of Pasteur, Lister, Tyndall, and others; and that they are as absolutely true as any other scientific fact. The most important agencies produced by them are of a putrefactive character; in wounds, those germs which produce septic poison are regarded as common forms, having more or less identity of action; in disease, they are thought to have a distinct specific character for each form of malady.

As there are important differences in function in the several varieties of common or "surgical" germs, I would ask your attention for a few moments to some of the leading peculiarities which characterise them—a consideration of which may assist materially in the inquiry we have undertaken.

The germ-forms which act as ferments are represented by three types—viz., the yeast-cell, the bacterium form, and the micrococcus. Other intermediate forms exist, which are known as bacilli of various kinds, but they are all referable to one or other of these groups. In the familiar form of yeast the germs are spherical. During the process of growth, they multiply with great rapidity by germination or budding, setting up at the same time a chemical change in the saccharine fluid. It is not, as yet, precisely known how this change is effected: whether, as some suppose, by the secretion of a ferment, or whether by the abstraction of certain chemical elements, thus allowing a rearrangement of the particles. There is no evidence of a secreting power, though some recent observations (such as those of Hoppe and Traube) seem to render this possible. But it is certain that the germs abstract oxygen from the fluids, and, looking at the enormous increase in their bulk, it is evident that they also largely abstract carbon from the sugar, and this readily explains the production of alcohol and carbonic acid. During active growth, the nuclei may be seen moving rapidly within the cells. The growth of the germ-cells is found to be checked very quickly by variations of temperature, and by the addition of various chemical substances—such as acids, alkalies, spirit, and especially by excess of oxygen; and also by excess of sugar, as is seen in the resistance offered to fermentation by saturated solutions. This kind of resistance seems to negative the idea of there being a secreting power in the germ; and it clearly points to a principle which is of vast practical value in explaining the mode in which germs become inert in the tissues, and renders clear the part which dilution of fluids plays in favouring molecular mobility and chemical change.

The yeast-cell shows a certain power of selection in the matter of food, so that, when it has been grown in one kind of medium, it acts with difficulty in another. It becomes educated, as it were, to its special work.

If we trace the life-history of the cell, we see that there is no such thing as a distinct species, but that several, if not many, species are combined under one form; and, though these are large bodies, compared to morbific germs, no microscopist has yet ventured to assert that he could distinguish one species from another, in the way that has been done with bacteria and micrococci. It is only when they are allowed to develop and fructify aerially, that the specific distinctions become manifest.

When yeast becomes mature, the cells are filled with nuclei, and if it be dried the cell-walls disappear, and nothing remains but a mass of coccobacteria, the original nuclei. The substance, when dried, is hard and horny, and will keep for a long time in this form, and portions, if it be grown in wort, will at once redevelope into yeast. Even after seven years, I have found the germs active and capable of thus redeveloping. If the recent yeast-cell be dried on a microscopic slide, it does not shrivel, but, after losing its water, assumes an oval form exactly like bacterium termo: a similar form is assumed when it is placed in acid or in alkaline solutions.

Yeast plays no part in surgical affections, being only formed in the human body in certain affections of the stomach. It is worthy of note that it exists nowhere naturally, but is a purely artificial product in saccharine solutions. In wine and other spontaneous fermentations, the initial forms are not yeast, but lower forms which develope into yeast. The lower forms of germ which are concerned in pathogenic processes, require for their development some albuminous compound, in which they set up putrefactive changes, and produce a septic poison. Like yeast, they require oxygen to commence the fermentation, but are said to be killed by excess of oxygen.

Nägeli asserts that a form which is thriving in one particular fluid, may have its action destroyed by another form grown in a different fluid; and he maintains further, that it is possible, by cultivation, so to alter the properties of a bacterium, that it no longer has the power to produce the changes originally associated with it, and that thus, by change of conditions, varied functions may be set in action.

Billroth held, too, that one species may produce various results according to soil; but this is denied by Klebs and Cohn. Professor Büchner found that hay-bacillus acquires virulent properties when cultivated in albuminous fluids, and Dr. Gräwitz has seen the same result occur in the case of aspergillus.

The poison generated in dead albuminous substances has been shown by the researches of Gaultier to be a fixed alkaloid with very active properties. Selmi, who confirms Gaultier's experiments, has shown that these alkaloids, or ptomaines, cause "dilatation and irregularity of the pupil, instantaneous retardation of the heart's action, convulsions and death." It is asserted by Klebs that the poisonous principle in such a disease as anthrax, is not communicated except through the germs; that if these be removed by filtration through clay, the filtered fluid is innocuous if injected into the blood. Harley's experiments, on the contrary, show that filtered fluids which have undergone previous decomposition, caused death with great rapidity.

I may mention here an observation which I made in 1864, which is not without interest on the subject of bacteria. In the hospital here, which at that time, from defective sewers and bad ventilation, was in a bad sanitary state, we had some severe cases of erysipelas, and one or two of pyæmia. At my request, the then house-surgeon, Dr. Buckle, sent to me a chip from the floor under each of the beds. These were numbered, but the position of the beds was unknown to me. I had no difficulty, however, by microscopic examination of the wood, in determining, from the presence and number of bacteria, which were the beds occupied by the severe cases.

Micrococci, or coccobacteria, have been found in various diseases, as in measles, small-pox, cattle-plague (Beale), in erysipelas, in acute abscess, and the discharge from wounds antiseptically treated. They have been regarded as the contagia in these forms of disease, and are considered by Dr. Sanderson to be mainly composed of albumen, and he considers that there are innocent as well as malign organisms; and from the observations of Nägeli, Büchner, and others, it is pretty certain that the injurious character of germs is acquired by cultivation in albuminous fluids, and that, when so acquired, the new properties are capable of indefinite extension in the same form. This is very nearly the view held by Mikulicz. That these minute organisms exist in blood-poisoning, is made fully evident, but as Dr. Ogston points out, a single negation destroys them all. One set of observers, as Pasteur, Billroth, etc., ascribe to them all blood-change, while others, as Dr. Watson Cheyne, regard them as harmless.

From this it would appear that the species of ferment is determined by this newly acquired power of selection from the surrounding media, or else that the germ carries with it a portion of virus, the germ itself acting only as the originator of catalysis, the virus determining the form and fermentation. If this change of appetite in the germ be proved, as I think it can be very easily, it affords a rational explanation of the so-called "specific" forms, a belief in which rests solely on the varied phenomena of contagia, and not on actual differences of forms as distinguished by the microscope; for it would be the height of absurdity to suppose that anyone can make such distinctions between the most minute initial forms of contagia, which, as Dr. Maclagan admits, must often be invisible with the highest powers of the microscope. But this is not the time to enlarge on this question. I would merely mention here one fact in connection with the subject of specific germs, and it is, I think, one full of meaning.

The germs met with in surgical processes are, as we have seen, of non-specific or indifferent kinds. If, in a strictly surgical case, we were to find a form of germ arising, with a power of exciting a new form of fermentation, highly infective, and generating the same form of disease, just as occurs in any of the eruptive diseases, we should, I imagine, be justified in regarding "specific" forms as of very doubtful reality. Now, in puerperal fever we may find the condition I have mentioned. A new power of fermentation springing up under surgical conditions in which it would be unreasonable to suppose specific forms to exist, and in which, therefore, we can only account for the new properties by an alteration in the ordinary forms of germ. It has been asserted by some observers that these forms are capable of passing one into the other. Nägeli holds this opinion, and Billroth has made observations which tend in this direction. Dr. Klein's researches on bacillus anthracis are opposed to the change of pathogenic into septic bacteria, neither does he find the virulent character of the bacilli diminish by cultivation as Pasteur asserts. M. Pasteur asserts that micrococcus is never converted into bacillus: that he has never seen it, and that therefore it cannot be; that any such belief is wrong, and that everyone is wrong who does not believe in the specific nature of germs.

If dogmatic assertion could be received as equivalent to demonstration, Pasteur's position in this matter might be regarded as unassailable. But I venture to think that the fact of his not having witnessed the process of transformation is no evidence at all of its not occurring. He might on the same grounds deny the specific identity of a hen and her chicken, because he had never seen the one developed from the other. It would require long and patient and incessant watching over many days to see this process continuously to its completion, even could the conditions necessary for growth under observation be maintained, and this is by no means easy. But there are certain facts which can easily be observed. Just as in the development of the chick, you can see as it were the egg laid. Yeast can be so manipulated that you have nothing but eggs, or micrococci; with other changes, you can see the yeast become a bacterium. You can see and watch the growth of this into bacillus, the chain of tubes gradually diminishing to the extreme attenuation of vibrio and spirillum-forms, without any break of continuity. This I have observed any number of times and can readily demonstrate.

In the cultivation of microbacteria they can be seen to undergo change into bacilli. Mr. Cheyne says he has never met with an instance in which a micrococcus has become a bacterium or *vice versâ*.

If they do not grow into bacteria—into what do they grow? It would be strange indeed if they existed continually as micrococci, and if bacteria retained always that form. Any such supposition as this is certainly negatived by much observation and many facts.

Since this paper was written, I have made some experiments with pus as a ferment, and have found it capable, under certain conditions, of producing alcoholic fermentation in saccharine solutions. The pus contained, when examined microscopically, only a few bacteria and very few micrococci. A distinct vinous odour was produced with an escape of carbonic acid, and the formation of a "yeast" on the surface. The test solutions exhibited no change whatever. The ferment therefore must have been the bacteria, the micrococci, or the pus itself.

There are thus two distinct forms concerned in the septic process, the first of which, bacteria, are specially concerned in causing putrefactive changes, and are very susceptible to the action of carbolic acid, while the coccobacteria are said to be of two kinds, innocent and malign, and to be unsusceptible to the action of carbolic acid.

Koch states that the spores of bacillus anthracis can resist 1·20 watery solution of carbolic acid for a considerable time.

The resistance which germs offer to the destructive action of antiseptics is not less remarkable than the fact of putrefaction being prevented by solutions which are admitted to be insufficient to kill the germs.

Those of you who followed the controversy on spontaneous generation which took place some years ago will remember the extraordinary difficulties which have to be surmounted in the destruction of germs, which were proved to possess a singular degree of vitality. And it must have occurred to you as at least a curious fact that when all these precautions had failed to ensure perfect asepticism, this should nevertheless be easily accomplished by a one or two per cent. solution of carbolic acid.

It may also have occurred to you as equally curious that if germs were destroyed with such difficulty, they should be so readily killed in vitalised animal fluids, which must themselves be more easily killed than the germs they contained.

"Once micrococci have gained access to a wound, it is not easy to eradicate them. Ordinary Lister's dressings will not do so (eight cases). After weeks of dressing with carbolic lotion (three cases); carbolic oil, 1 : 16 and 1 : 8 in strength (eight cases); after the use of dressings with boracic lint (four cases), salicylic acid (one case), and chloralum (one case), all carefully and thoroughly applied, they were found in the wounds and ulcers in nearly as great numbers as before; and it was clear that these applications, at least as ordinarily employed, *although generally sufficient to kill bacteria and bacilli, are powerless to eradicate the micrococci.* The only way in which I succeeded in destroying them in wounds, where they had once established themselves, was by cauterisation with strong solution of chloride of zinc, or by strong frictions with five per cent. watery solution of carbolic acid—the ordinary 1 : 20 lotion." (Dr. Ogston.)

Many observations have been published proving that the blood and tissues have the power of ridding themselves of germs. Dr. Ogston's experiments on this point are of singular interest. He found that micro-organisms were present in all acute but not in chronic abscesses. Twenty experiments were made on guinea-pigs and mice by injecting pus from cold abscesses into the tissue of the back. "The invariable result was that no illness or abscess ensued; that the pus was, within a week, dried up into a film pervaded by living cells; and that within ten days this film had become totally absorbed; so that no trace of it remained when the animals were killed, and the site of it was undiscoverable."

But when pus containing micrococci was injected in the same manner, symptoms of blood-poisoning ensued, and lasted from two to five days. "The mice showed the purulent conjunctivitis described by Koch, in his experiments on septicæmia" (a symptom which occurs also in pyæmia in the human subject); "but after a time varying from five to seven days, the animals became active, and seemed well. Those which were killed during the period of fever were found to have the blood teeming with micrococci, eight or nine times more numerous than they were in the fluid injected; and, at the point of injection, an abscess-cavity had formed, with more or less disintegration of the surrounding tissues. In those killed during the stage of convalescence, micrococci were found more rarely in the heart-blood, and the infiltration of the organisms into the tissues around the abscess no longer existed, having been replaced by a firm thick wall of granular tissue, in which micrococci could seldom be detected."

Mr. Lister, referring to these experiments, admits that micrococci must not be regarded as the essential cause of inflammation, and that their occurrence in acute abscesses was due to lowered vitality; an admission which rather increases than solves the difficulty, for one would have supposed that lowered vitality was rather characteristic of the cold abscesses in which germs did not exist.

Mr. Cheyne asserts that micrococci grow with greater rapidity in pure oxygen "than under any other circumstances which he has tried"; and yet, in speaking of the open method of treatment, he says that "another antiseptic advantage is gained by the free admission of oxygen to the discharge."

Though always believing fully in the germ-theory of disease, I have long had the conviction that destruction of germs by the Listerian method did not fully explain all the success in surgical operation. It was in 1866, in the early days of the system, that a case came under my care which seemed to warrant the belief that the whole truth was not thus conveyed. A man, aged 74, while in a state of intoxication, fell over the threshold of his stable, and sustained a fracture of the tibia and fibula in the upper third. Unable to make himself heard in his calls for help, he attempted to walk, and thus forced the broken tibia through the skin and through his trouser, the end of the bone coming in contact with the manure. He bled very profusely, and when I saw him was in such a state of collapse, that amputation was out of the question. The bone, which was covered with dirt, having been carefully wiped, but not washed, the wound was enlarged to admit of reduction. The clot in the deep and extensive cavity in the leg was left untouched, no water being used. A compress soaked in blood was laid over the wound, and the limb put up in splints. A piece of lint soaked in strong carbolic acid was laid over the compress, fresh acid being poured on from time to time. There being no discharge from the wound, the limb was not disturbed for a month; and, at the end of that time, the wound was found perfectly healed, without a trace of suppuration, and the bone was well united. Here we see an aseptic result without antiseptic treatment, properly so called. In this case, germs must have been present in abundance, and yet the blood-clot with which the wound was filled became organised. Mr. Lister considers that the organisation of clots depends on the exclusion of germs, but one such instance as that I have given shows that this is not the real explanation.

It has been asserted that the organisation depends on the inherent vitality of the clot, but this, again, can only be in a measure true, because the circulating blood, which is as fully vitalised, does not always resist the action of germs, which it ought to do, if this supposition be sufficient to account for the resistance.

Mr. Lister's later experiments on this subject tend to prove that germs have no power of causing fermentation in thin layers of blood-clot or albuminised fluids placed between two healthy tissues.

Mr. Cheyne points out the fact that extravasated blood, clotted and free from odour, if opened and the air admitted, becomes in a few hours fœtid and putrefied; whereas, if kept in a flask, the same blood would remain sweet for weeks, even after the admission of germs; and the same is true of pus from chronic abscess connected with carious bone; so that it would seem that some other conditions are necessary for putrefaction besides the admission of germs.

What are these conditions? or rather, what are the conditions which oppose putrefaction, and how are they maintained? These are questions which must lie at the root of the matter; and, if they can be answered, it seems to me that the main points of antiseptic surgery become greatly simplified.

As to the success of abdominal operations without antiseptic precautions, Dr. Bantock states that, in a series of cases in which they were omitted after the operation, no bacteria appeared in the drainage tube, though this was many times exposed to the air. And he remarks, on the value of the drainage-tube, "It has been shown over and over again that the leaving even a small quantity of bloody serum to the chance of being absorbed, is a much more serious matter than the leaving a like quantity of blood."

It can scarcely be alleged, in the cases of colloid tumour removed by Dr. Bantock, that the tissues were in a healthy state, and yet they were capable of resisting the action of germs; so that there would appear to be some other factor at work than "a healthy condition," otherwise, all unhealthy conditions should lead to disaster.

Ogston found that pus and micrococci injected into the peritoneum of mice and guinea-pigs, produced symptoms of blood-poisoning for several days, after which they recovered. He inquires how can it be explained that germs "so deleterious when injected, as they are found in the pus of acute abscess, into the subcutaneous tissues of animals, are yet so harmless on the surface of wounds and ulcers."

The reflection would then naturally arise, that, inasmuch as the germs may fail to act, and instead of developing, may actually disappear, there must be some other mode of explaining their disappearance than the mere action of the so-called germicide; and, when it became evident that germs disappeared, if not with equal certainty, in some conditions where germicides were not used, we have to fall back upon some such explanation as this, "that the blood and tissues, when in a healthy state, have the power, as Cheyne says, of destroying germs when they are introduced into the body."

It is quite true, as shown in Harley's and Ogston's experiments, that the blood is capable of getting rid of germs when injected into the circulation; but it would be strange indeed if this were by any germicide power in the blood itself; strange if the blood were able to kill where carbolic acid is alleged not to kill germs. And so with the tissues; if healthy blood and healthy tissue suffice to kill germs, where is the need of antiseptics?

We have, in truth, no evidence whatever of any such power in either blood or tissues, and I can see no ground for such a belief, beyond the fact that germs disappear when in contact with them. How they disappear is another question. But is it not reasonable to suppose that when unable to act on any fluid, by reason of its stability, and thus obtain their proper food, they die, and become disintegrated? The maintenance of the healthy state which is thus able to resist germ-action must depend on the removal of impurity and the supply of new material; hence every healthy function of the body is antiseptic, because it tends to maintain this equilibrium.

In speaking of yeast, I mentioned a fact of importance in connection with surgical treatment, and one helping to explain the class of cases under consideration—viz., that a certain degree of saturation is an obstacle to fermentation, even when germs are present in abundance. For instance, simple syrup will not undergo fermentation, even though the surface be covered with fructifying fungi. Pasteur alleges this to be due to exposure to the air, which destroys the activity of the germs; but this is only a partial explanation, because it will not ferment, if air be excluded, so long as it is kept at rest; but if it be so placed that it can absorb water, or if water be added and the fluid be shaken, fermentation at once begins.

So with bacteria. Concentration of fluids hinders, and dilution favours their action. Now, why is this? Because dilution favours movement of particles, and hence promotes the catalytic action of the germs. No other change than this would seem to be necessary.

In wounds this concentration may be effected in several ways.

1. In open wounds, as formerly advocated and practised by Professor Humphry, inspissation of fluids is produced by exposure to the air; and I need not remind you how excellent and aseptic were the results thus obtained.
2. The same kind of action occurs in healing by scabbing.
3. Then there is the process of drainage, which leads to the same end, by carrying off the watery secretions.
4. There is the inspissation which occurs through the absorption of fluid by the peritoneum in abdominal operations.

This concentration of fluids then limits mobility; and we saw that one of the most striking features in the active yeast-cells was the movement of its nuclei. Recent observations have shown that a similar condition of bacteria, in which the so-called spores are developed, is the sign of increased virulence in action, and all germs in a state of activity are endowed with motion. Whatever hinders motion retards germ-action, and so we are brought to see the force of those admirable lectures of the late Mr. Hilton, on the value of rest in surgical treatment. If anything in the world is antiseptic, it is rest.

But if concentration hinders catalytic motion, it is equally certain that dilution favours it, and thus sluicing the wound with water is eminently calculated to produce this end. But water does more than this; it devitalises the clots which are hanging from the cut vessels, and thus leaves so many foreign bodies to undergo septic change.

In the history of the antiseptic treatment you must have noticed how gradually some of the details which were originally considered essential to successful results, have lost a certain amount of importance, while other details have acquired greater prominence. Thus, as the spray has lost ground, more importance is attached to drainage and ligatures capable of absorption.

And it is noticeable also that of late more and more prominence is given to aseptic treatment. Thus, Dr. Cheyne, in his recent work, the most admirable and complete yet produced on the subject, says, "the method we have agreed to term the aseptic method of treatment, is nothing more or less than a series of experiments on the germ-theory of putrefaction. Experiments made with the object of rendering atmospheric dust inert before it reaches the wounds."

This statement, so far as it goes, is fairly expressive, but it is apparent that its scope is too limited. Aseptic surgery, meaning that which prevents putrescence in wounds, must mean a great deal more than is here stated. For it has been shown already that wounds in which the germs have not been thus rendered inert, are still capable of being made to heal aseptically—and it may be fairly asserted that the aim of all good surgeons is and always was to produce an aseptic condition; though it was left to recent times to explain on what this condition depends. Much of the old treatment moreover, was, as Mr. Cheyne points out, antiseptic, and there is perhaps no better or earlier instance of this than the oil or wine mentioned in the parable of the Good Samaritan.

With some show of reason is the complaint made, by Mr. Morris I think it was, that we might imagine before the Listerian system there was no surgery. It must be admitted that the system has appropriated to itself the whole domain of surgery—for we now find that it claims as antiseptic every detail of surgical procedure. But when these are said to be antiseptic, it is, in fact, only another way of stating that the aim of all surgery is antiseptic. That surgery is good only when it fulfils these conditions, and favours the healing of wounds.

Now, as germs only grow—for the most part at least—injuriously, in dead or putrescent material, the object of surgery must be to leave no nidus for them to grow in, and the more completely it fulfils this end the better and more antiseptic it becomes.

If we wish for an example of perfect surgery, we may take the gardener's art of grafting. Here is an operation, not performed "antiseptically," which yet yields an aseptic result, though the juices of the plant are as much exposed, and as liable, to the attacks of microzymes as are those of the human subject. This result is obtained by the wound being cleanly made without leaving any dead or foreign matter in it, the cut surfaces being perfectly brought together and maintained in a fixed position in a state of rest. If these conditions be fulfilled there will certainly be union, for there is no nidus on which germs can develop. If, on the other hand, there were vessels to be tied, sloughs to separate, clots of blood hanging out of cut vessels and devitalised by sluicing with water—said water commonly teeming with germs; if there were a bone to be sawn asunder, leaving the dust in the wound, and jagged edges to irritate the cut tissues; if the increased secretion of fluids, caused by this kind of irritation, were pent up in the wound; if the graft were loosely inserted, so that it could be blown about by the wind, leaving the edges of the wound in a constantly varying position, would the gardener, think you, look for a successful issue?

Similar conditions to those found in grafting are needful in surgical operations. There must be the clean cut; the thorough removal of all dead or decomposable matter, of all vegetalised clots, and all sloughing tissues—the vessels closed by ligatures, which are absorbed; there must be perfect adaptation of surfaces and edges; and complete rest of all the parts until union is secure. According to the extent to which these points are carried, will be the degree of asepticism.

In perfecting the details which aid in obtaining this result, no one, I suppose, has done so much as Mr. Lister, with his improved forms of ligature and drainage; to say nothing of his varied antiseptic appliances, and all the thorough cleanliness of instruments and surgical material on which he so much insists. Of these I need make no mention here, my object being to point out the mode in which we may explain the production of an aseptic result without the aid of the so-called antiseptic treatment; not that any of such aids are to be undervalued or neglected, but because if we once arrive at the *rationale* of healing under the simplest conditions, it cannot fail to help us to a better mode of dealing with the more complex.

From what has been stated, then, we may conclude that in all wounds the healing process depends on three conditions: First, the complete removal of all decomposable matter, so that there is nothing in which germs can develop. Next, that the fluids which of necessity remain in the wound should be so drained of their watery elements as to leave sufficient concentration as a bar to catalysis. And thirdly, since motion is the material excitant of ferment, absolute rest of the wounded parts tends to prevent effusion of fluids and to favour absorption, and thus helps to fulfil the second condition. Assuming that these three propositions are true, and that they are adequate to explain the healing of a simple incision, it is obvious that they must also lie at the root of all surgical procedures; and you will observe that this view in no degree opposes, but rather supports, the germ-theory.—*British Medical Journal, July* 14, 1883, *p.* 53.

2.—TREATMENT OF ZYMOTIC PYREXIA BY INHALATION, AND ON THE USE OF AMMONIATED CHLOROFORM.

By Benjamin Ward Richardson, M.D., F.R.S.

As far back as the year 1853 I treated at Mortlake a case of what we then called phagedænic croup by the inhalation of chloroform vapour in combination with the vapour of ammonia. There had been an epidemic of croup in the village, and in three fatal cases I had found, on post-mortem inquiry, separation of fibrine in the heart, and had assigned the cause of death to the resultant obstruction. I was led, thereupon, to administer ammonia very freely, by the mouth, in such cases in order to maintain the fluidity of the blood. In the particular case to which I refer above the patient was a child six years of age, who absolutely refused to swallow medicinal doses of ammonia. In the house in which he lived there had been a death of another child from the disease, and as in this new case death seemed certain, I determined to administer the ammonia by inhalation in combination with chloroform, the parents of the child yielding a willing assent to what they felt was, in fact, a last chance. With very little trouble I produced a gentle narcotism with the combined vapours, and was then able to increase the quantity of ammonia considerably. I kept up the inhalation for fourteen hours, administering food by enemata.

During the time of inhalation the late Dr. R. Willis, with whom I was then associated in practice, looked in several times, and I sent a message to London to ask Dr. John Snow to come down and see the patient, a request with which he complied with his usual generous promptitude. In brief, the patient began to breathe with comparative ease within an hour after the commencement of the inhalation. In the course of three hours he had a loose cough, with expectoration, which was easily ejected, although there was continued sleep. The fever rapidly subsided, and, when the vapours were finally withdrawn, there was quick return of consciousness with complete subsidence of the acute symptoms. The recovery was rapid and complete.

While Dr. Snow was President of the Medical Society of London he called upon me one night to fill a gap by relating the particulars of the above case as "a casual communication" to the Society, and referred with commendation to the line of treatment I had carried out. He was also much interested in a theory I had formed at that time, to the effect that we ought to be able to control all the zymotic fevers by the process of inhalation, and while others considered the idea as visionary, he frequently encouraged, and even urged, me to follow it up by careful experimental research. I fear I have been too remiss in acting on this encouragement, but I have not neglected it altogether, and now I am recalling it more decisively.

In the way of such research I was once led to inquire what effect the vapours of ammonia and chloroform alone and combined had on putrefactive changes. I learned thereupon that each vapour in its separate state is a remarkable antiseptic, and that the two act admirably in combination. These facts have all been related in my lectures to the Society of Arts on the Preservation of Dead Animal Substances, and some of them formed the subject of a paper read during this session before the Medical Society of London, and yielded a demonstration of a specimen of blood which had been perfectly preserved in the fluid state, and free from any trace of decomposition, for a period of twenty years. In another series of researches conducted during 1867-70 I inquired what effect the vapours of chloroform and methylene bichloride and of many other vapours, alone and combined with vapour of ammonia, had on the temperature of warm-blooded animals.

Recently I have recurred to my original plan of administering chloroform vapour in combination with ammonia vapour in cases of zymotic fever, and as I have now made the administration exceedingly easy in practice, and as it seems to promise valuable results, I wish in this note to describe the method.

I take an alcoholic solution of ammonia (838 alcohol saturated with ammonia) and mix it in equal parts with chloroform or methylene bichloride. When the solutions are mixed, any separation of water that may occur is removed, and in this way a clear mixture of ammoniated chloroform is obtained ready for use. In administering this compound by inhalation of the vapour, I put two fluid drachms of it into a small Wolf's bottle, and connect the bottle with a leather inhaler armed with an expiratory valve. The mouth-piece of the inhaler is held close to the mouth and the patient is instructed to inspire until bubbles of air are drawn pretty freely through the fluid in the bottle. The inhaler is in this manner charged with the vapours which are drawn into the lungs.

From the first the ammonia vapour is deprived of much of its pungency by the presence of the chloroform, and in time, as the narcotic begins to take effect, the pungency of the ammonia is covered so effectually that larger quantities of it can be inspired without cough or irritation. During the past week, in a puerperal case under the care of my friend, Dr. Rogers of Berners-street, in which I suggested this method in consultation, the patient inhaled freely every two hours for three days without the slightest discomfort and with obvious direct advantage. The effects of the inhalation seem to me to extend in four directions:—1. Under the sedative action of the narcotic relief from pain is obtained and repose, if not actual sleep, is secured. 2. Under the combined influence of the vapours there is reduction of temperature. 3. Under the influence of the ammonia there is a sustained fluidity of the blood and a production of freedom of secretion. 4. Under the action of the combined vapours there is an antiseptic result which is always favourable.

These are the points to which in this short paper I desire to call attention, dealing rather with a great and new principle of treatment than with its details. The principle is that through inhalation we should learn how to reduce zymotic fever at once, with direct precision, and without employing any of those medicinal agents which have to pass slowly into the system by absorption through the stomach, have to pass out of the system by slow elimination, and after all do not immediately command the position that ought immediately to be attained in the management of acute disease.

This principle once found to be correct, details will follow easily enough. I know at present of several vapours which reduce temperature more rapidly than those I have named, and I dare say there are vapours which are less complex than those, and yet possess the same properties. I can conceive again that in some forms of zymotic fever more or less alkaline vapour may be required than in other forms, and so on. These details will be subjects of independent and most interesting research. The end and object of such research, founded on the basis now suggested, will be to place living beings affected with what are now called fatal diseases of the acute type in such conditions that those human beings cannot die. I do not for a moment pretend that by the method I have here put forth we shall directly attain this goal, but I shall have played no bad part if I have taken a child's first step in so immortal a journey.—*Lancet, June* 9, 1883, *p*. 992.

3.—ON ACUTE RHEUMATISM AND PHTHISIS.

By J. Gordon Black, M.D.Lond., Harrogate.

In the Lancet of July 7th Dr. Austin calls attention to acute rheumatism as a premonitory symptom of phthisis, and gives the histories of four cases in illustration. The following particulars of a case attended by me last year may perhaps be of interest in connexion with this subject.

On March 6th, 1882, I first saw a pale, delicate-looking young woman, aged twenty. Both father and mother were dead, the former of phthisis, and a sister was then suffering from that disease. My patient had been doing rough hard work beyond her strength in a cold damp atmosphere, for some months. At the previous Christmas she caught cold and a cough ensued. She had, however, been away from work only two days. The symptoms were on examination :—Short dry cough with pain under left axilla, sickness and vomiting of food, sleepless nights, and free perspiration. Pulse 100, weak, and pupils dilated. Tongue red in middle, furred at the sides. Temperature only slightly above, and respiration, normal. Menses regular, but discharge too pale. Some rough breathing below left clavicle; no dulness or crepitation. No increase of cardiac dulness, but sounds unduly accentuated. At this visit I was undecided as to the exact nature of the attack, fearing some lung mischief or impending febrile disorder. A diaphoretic and expectorant mixture was prescribed and the affected side ordered to be poulticed. Next day I found that the cough and sickness had entirely left her. The pain was still bad in the side, and perspiration continued. Temperature 102°, pulse 100. A soft murmur was now heard with the first heart sound, loudest over the pulmonary cartilage, slightly conducted towards the apex, but not heard over the second right cartilage. The right knee and ankle were swollen and tender. Thus the affection had developed into rheumatic fever, and the signs of lung implication suddenly disappeared. Salicine treatment happily soon gave relief to the distressing symptoms, and by the second day of its use the patient was comparatively well.

The cardiac murmur became much less audible, but never went entirely away. At the end of March the patient, being rosy and plump, in complete contrast to her previous condition, was allowed to go to a farmhouse in the country.

On April 17th, a few days after her return, I saw her again, and was shocked at the serious change which had occurred. She was now in bed, complaining of excessive muscular weakness. The cough, fever, and vomiting of food had returned worse than ever. Some dulness was now noted in both infra-clavicular spaces, and at the top of the sternum. Pectoriloquy and mucous râles were heard on the left side below the clavicle, whilst on the right there was double respiration. Expectoration was copious and nummular. Pulse 120; temperature 101°. By April 27th the above symptoms had become greatly aggravated. The expectoration was tinged with blood, and there were signs of a vomica at the top of the left lung. For the next few weeks the disease progressed with the fearful rapidity of so-called "galloping consumption"; but afterwards, curiously enough, became quite chronic. The appetite had never failed, and from first to last colliquative diarrhœa was absent. Thus were the powers of nature sustained until the patient had become a veritable skeleton. Death occurred on the 24th of November.

The succession of symptoms above detailed arrested my attention as being unfamiliar, and I was therefore much interested to observe that Dr. Austin had recently attended four somewhat similar cases. Judging by my own experience, I should say that acute rheumatism is a rare complication of phthisis. The text-books are almost silent on the subject, nearly every other ailment, however, being mentioned in that category. Under the head of Acute Rheumatism we find no allusion to the existence of a tubercular variety, though others, such as scarlatinal and gonorrhœal, are enumerated. At one time the phthisical and rheumatic diatheses were even thought opposed to each other. The following exceptional reference is made towards the end of the late Dr. Hughes Bennett's article on Phthisis, in Reynolds's "System of Medicine:"—"Pericarditis and other inflammatory diseases may occur, occasionally gout or rheumatism." And from the construction of what immediately follows, one gathers that Dr. Bennett did not consider such complications to bear "an essential or constant relation to phthisis."

Now, such a view seems to me more in accordance with symptoms than Dr. Austin's theory that tubercular deposit in the affected parts is the cause of the rheumatic manifestations. It is noticeable that when tubercle occurs in different organs and membranes during the course of phthisis pulmonalis, it does so as part of a general constitutional affection, with which the local developments do not tend to interfere and which the latter do not mask. It is perfectly different, however, when rheumatic fever intervenes. This seems completely to replace the signs of pulmonary affection by others peculiar to itself, which then have their ordinary course and termination. Further, the well-known tendency of tuberculosis to produce chronic inflammation and ulceration does not accord with the equally familiar temporary and changeful character of acute rheumatism, in which disease ulceration is exceptional. If Dr. Austin's theory were correct, one would look for ulcerative endocarditis or serious disorganisation of joints in cases of phthisis complicated by rheumatism. We know that such results are not uncommon where other specific agents of inflammatory action are present, such as gonorrhœa or scarlatina. Another argument may be adduced from a consideration of the results of treatment upon the phases of disease under notice. The well-known power of salicine to control acute rheumatism, a good illustration of which is furnished by the case related above, contrasts strongly with its utter uselessness in checking tuberculosis. If both sets of symptoms in my case had been due to one general cause —viz., tubercle—then one fails to understand the marked difference observable in the effects of salicine. Considered in connexion with pulmonary consumption, I am therefore inclined to regard acute rheumatism as a somewhat rare accidental complication of the former, to which malady it bears no necessary relation. Although it cannot consequently be properly regarded as "premonitory," yet it is well to remember the possibility of its advent as an early complication. Unless this be kept in view during attendance upon a delicate patient suffering from rheumatic fever, especially where there is a family history of phthisis, a too favourable prognosis may be ventured, to the disappointment of the friends and possible discredit of the medical attendant.—*Lancet, Sep.* 22, 1883, *p.* 494.

DISEASES OF THE NERVOUS SYSTEM.

4.—ON THE ACTION OF BELLADONNA.

By Hugh Owen Thomas, M.R.C.S., Liverpool.

Difference of opinion prevails among therapeutic authorities as to whether certain drugs are endowed with sedative or stimulant properties. I shall only discuss the physiological effect and medicinal results that follow the use, either experimentally or therapeutically, of belladonna, this drug being selected by me in consequence of its value in the treatment of collapse.

By the term stimulant, I mean any matter which, after its introduction into or absorption by vital tissues, increases the activity of the condition antecedent to its introduction, without supplying the source of force for maintaining this increase of power or function—as food can do, *i.e.*, a stimulant draws upon a reserve, which can only be renewed by food. How therapeutists could have come to the conclusion that belladonna "possesses powerful anodyne and hypnotic properties"—"valuable anti-spasmodic"—at the same time, "stimulant effect on the circulation"—"potent diuretic"—is to me explicable only by the supposition that investigators have not made the physiological doses of belladonna the basis for their deduction in prescribing, and its toxic effects their basis for antidotal treatment.

If the symptoms which follow the physiological doses of belladonna are analysed, there always remains evidence of stimulation, and during its action the phenomenon of special affinity for certain structures is demonstrable, just as may be observed during the action of sedatives. Its effect in full physiological doses is to stimulate the radiating fibres of the iris by its special affinity for the sympathetic nerves, a branch of which aids in regulating the radiating muscle of the iris; but it may be said that this dilatation of the pupil by belladonna arises by the same mode of action as that which causes henbane to dilate the pupil. But this objection is inconsistent with the fact that the blood-vessels are diminished in calibre when under the influence of belladonna, from contraction of their muscular coat (necessarily a stimulative result), so that the pulse is less perceptible, but increased in tone, and the temperature becomes elevated. Further, the heart's action is always accelerated by belladonna from its primary affinity for and stimulating effect on the vagus nerve, which nerve this drug can protect from the collapse arising from mechanical irritation, provided the use of the drug be such as not to approach too near the toxic area. During the action of belladonna the solid constituents of the liquids excreted are increased —another phase of stimulation. Hitherto no evidence has been made known which shows that belladonna retards life so long as its action does not overstep the area of physiological action —that of safety; and this area of perfect safety in a healthy subject is exceeded as soon as the drug, whether sedative or stimulant, begins to act beyond the structures which they have a primary or special affinity for. A remarkable discord of opinion exists in explanation of how belladonna can benefit in medical practice. With some of these views I coincide, from most of them I must dissent. For instance—"Belladonna allays pain . . . . the attendant spasm . . . it relaxes muscular fibre" . . . "in spasms the expulsive effects are moderated" . . . : Belladonna relaxes the hollow viscera, and it is to this effect that we must attribute its antispasmodic as well as expulsive action—Harley, Vegetable Neurotics, page 230. "By relieving spasm arising from irritation of the air tubes, gall ducts, and ureters in bladder, belladonna is serviceable."—Royle, Materia Medica, page 495.

These quotations, all from recognised authorities, are a collection of contradictions. If it allays pain, relieves spasm, relaxes muscles, how can it possibly have an expulsive action?

"The constricting fibres of the intestines and of the ducts of glands, are, in like manner, relaxed by belladonna, and of this we may take dilatation of the pupil as the outward sign. The dilatation of the pupil under the influence of belladonna is active and due to a stimulant effect on the sympathetic nerve." —Royle, Materia Medica, page 493.

If the constricting fibres of the intestines are relaxed by belladonna, how the dilatation of the pupil by the same drug can be an active change I fail to perceive. This inconsistent teaching appears to have arisen from a misinterpretation of the mechanism of stimulation on the non-striated muscle. For instance, the effect that stimulation has upon the pupils, and upon the muscular coat of the blood-vessels. As an example —"The sympathetic has, it will be observed, an effect on the iris the opposite of that which it exercises on the blood-vessels. When it is stimulated the pupils are dilated, while the blood-vessels are contracted."—Foster's Physiology, page 466. "It is probable that these fibres are under the control of the sympathetic system of nerves. If so, it must be observed that the sympathetic nerves have an effect upon the iris directly opposite to that which it exercises upon the blood-vessels, since when it is stimulated the pupils are dilated, while the blood-vessels are contracted."—Ranney, Applied Anatomy of the Nervous System, page 133.

The sympathetic has not an opposite effect on the iris to what it has upon the blood-vessels. Stimulation of the sympathetic nerves excites the circular muscular coat of the blood-vessels to contract, and this contraction can only take place in the direction of diminishing the area of a circle. The iris being a radiating muscle, then, if stimulated through the sympathetic nerve, it can only contract in the direction of its largest circumference, as the iris is a radiating muscle attached at its greatest or external circumference, so that it can only contract in the direction of its outer circumference, its base of resistance, and so dilatation must occur when the radiating muscle of the iris is in action; theoretically, dilatation of the pupil corresponds to contraction in a blood-vessel, when either is under sympathetic stimulation. "Retention of urine is a frequent result of a full medicinal dose of belladonna."—Royle, Materia Medica, page 492.

In the above quotation we have another out of many errors in regard to the action of belladonna that can be found in standard works written on therapeutics; it is an example of the toxic action being selected as evidence of the medicinal result of a drug. Retention of urine is not a result that follows a medicinal dose of belladonna; but it may be urged, if it is not the result of either a physiological or medicinal dose of the drug, it is fair evidence that it relaxes the muscular coat of the bladder and points to a sedative effect. This I deny. It is excellent evidence that it is a stimulant, and this toxic effect of belladonna upon the bladder is quite consistent with its effect upon other structures, and in support of this contention my reasons are the following:—

If the anatomy of the nerve supply to the bladder be considered, it will be found that the upper part of the bladder is supplied from the hypogastric plexus of the sympathetic, while the spinal nerves can be traced directly to its neck and base.

The most reliable authority on the action of the vegetable neurotics has conclusively established that large doses only have the effect of causing retention of urine, and I hold that causation of this act arises in this manner. As soon as a toxic dose of belladonna has crossed its area of physiological action (vagus and sympathetic), the store of nerve energy within this area upon which it has primarily drawn is much diminished, but further forward in the toxic area which includes the vagus, the sympathetic and spinal nerves, the store of energy within the spinal nerve is in full force, until this area is crossed and death supervenes. These toxic doses of belladonna, having exhausted the nerve supply of the body of the bladder, at a time when it is commencing to stimulate the base and neck, must necessarily give rise to retention of urine.

As regards the doses of atropia, it is my opinion that when administered by the subcutaneous method, any quantity exceeding 1-48th of a grain becomes a toxic dose, and that, provided the drug be of good quality, it is always advisable to commence with much less, say 1-60th, and increase gradually until the physiological effect is attained.—*Medical Press and Circular, March* 21, 1883, *p.* 248.

5.—CASE OF SUTURE OF THE MUSCULO-SPIRAL NERVE FIVE MONTHS AFTER ITS COMPLETE DIVISION, WITH ULTIMATE RESTORATION OF ITS FUNCTIONS.

By T. Holmes, Surgeon to St. George's Hospital, London.

Cases of suture of divided nerves are not yet so common as to be of no special interest, and more particularly when they show any point on which our experience is defective. The one which is here related is chiefly remarkable for the long period which elapsed before any decisive symptom of amendment ensued, as well as for the complete restoration of function ultimately obtained.

C. J. S——, an intelligent man, aged thirty, was admitted into St. George's Hospital on Feb. 23rd, 1881, on account of paralysis of the right wrist, the result of a wound received five months previously in falling through a skylight, for which he was treated at the Royal Free Hospital. He said that for a week after the accident he had entirely lost sensation in the forearm and hand, but this partly returned at that period, and had since remained in the same condition. On his admission there was the scar of an extensive irregular wound on the outer side of the back of the elbow. The hand dropped completely when held with the palm downwards. He could pronate and supinate the forearm freely, with the elbow flexed, but could not extend the wrist or fingers in the slightest degree, and supination was impossible in the extended position of the forearm. There was decided loss of temperature over the outer aspect of the forearm, and sensibility had diminished in the same situation, as well as over the back of the wrist and hand. He complained of no pain in the arm, but there was a tender spot at the extreme end of the scar, just external to the biceps tendon and about three inches from its insertion. The limb was much wasted, the forearm being at its widest part nearly one inch less in circumference than its fellow. The electrical reaction of the muscles was not tested. On March 10th, 1881, the operation of suturing the nerve was performed. Esmarch's bandage having been applied, the lower end of the nerve was easily found under the scar; the upper one, which seemed to have retracted, was discovered by a little dissection. It terminated in a large bulb, larger than a common pea; the other end was somewhat atrophied. The two ends were rather more than an inch apart. A little was taken off the lower end of the nerve, so as to refresh it, and a portion (but not the whole) of the bulbous upper end was removed. Then, on extending the limb, it was found possible to draw the ends of the nerve together, and a catgut suture was put through the sheath on one side and a suture of fine silk on the other, avoiding the nerve-fibres as far as possible. Examination of the portion removed from the bulbous end showed marked increase of endoneural connective tissue pressing upon and constricting the nerve fibres, and atrophy of some of the latter; no fatty degeneration. The operation was performed antiseptically, and the wound united by first intention. On March 14th it is noted, "There is a tingling sensation experienced in the arm, localised to no particular area," and on March 15th, "There certainly seems to be some power of extension returning, for with the wrist held tight to the splint he can make slight movements of extension of the fingers." A few days later it was thought that the sensation at the back of the hand was more perfect. This, however, was dubious. He then left the hospital at his own wish, and nothing more was heard of him till March, 1883, two years after the operation, when he returned to show how completely he had recovered. There is now no perceptible difference between the two arms, though perhaps the affected arm (the right) is somewhat less muscular than it would naturally be. Sensation, however, is perfect, and all the movements of extension of the wrist and fingers are performed as well on one side as the other. He says that it was about a year before the improvement was very obvious to him; but then it began to amend rapidly, and now he uses the limb as well and easily as before the accident.

Remarks.—There have been now many cases published in which the operation of uniting the divided ends of large nerves has been practised both immediately and at considerable intervals after their division. The case which most impressed the minds of surgeons, and which brought this operation prominently before the profession, was Mr. Wheelhouse's, in which a man was admitted into hospital on account of paralysis of the lower limb nine months after section of the great sciatic nerve. He was placed under Mr. Wheelhouse's care with a view to amputation, so completely useless was the limb; but regained the use of his leg after the suture of the divided ends of the nerve. This man, as I understand from some notes of his case which Mr. Wheelhouse has kindly sent me, was discharged from the hospital three months after his admission with slight but obvious symptoms of returning motion and sensation, and was able to return to work as an agricultural labourer in four months from that period, or rather more than half a year after the operation. He was again seen nearly two years after his first admission, when there was still some remnant of his injury, the leg being colder, the foot more extended, the limb rather smaller, and one of the toes ulcerated in consequence of its extended position. Ultimately this toe was amputated and an instrument applied to remedy the position of the foot, and when last seen he was in Mr. Wheelhouse's words "cured and able to do anything." This brilliant success led to the adoption of the operation in many similar cases with varying success; and also led to the practice of uniting the divided ends of nerves in recent wounds. The latter class of cases, however, differs in many respects from those of old injury, for it is a matter of constant experience that nerves may regain their function, not only after complete division, but even after resection of considerable portions of their entire trunk. The trunk of the nerve in these cases is reproduced by a process which has been completely studied experimentally. Dr. Brown-Séquard exhibited to the Société de Biologie at Paris the hind limb of a monkey, "on which in two months and twelve days nearly the whole extent of the sciatic and tibial nerves had been reproduced after an excision of twelve centimetres ($4\frac{2}{3}$in.). The motor and sensory functions had not yet returned." It is therefore impossible to say in any case of recovery of function after immediate suture whether the same result would not have followed had no suture been used.

Is the case of old injury and persistent loss of function really different? In other words, in such a case as Mr. Wheelhouse's, where the parts supplied by the divided nerve have been paralysed for a long period, will they recover if left to themselves? That they do so in some cases I think certain. I perfectly remember the case of a police constable who, in the year 1866, received several stab-wounds, one of which severed the musculo-spiral nerve. He was treated for the direct effects of his injuries in Guy's Hospital by Mr. Birkett, but was under my observation for a considerable period afterwards, being employed at the Metropolitan Police Office in some light work. For a long time the hand and wrist dropped, and the extensor tendons were replaced by an apparatus of elastic bands. But slowly and after a long period of total paralysis the functions of the limb returned, and I have ascertained that the restoration of function is now complete. The man was not able to dispense with the apparatus for two years and a half, and it was about two years before any trace of improvement commenced. Now, however, both motion and sensation have so entirely returned that the arm is almost as strong as the other, and the only thing he complains of is that he feels the cold more in that arm. In that case, however, Mr. Birkett, who had charge of the case and, I believe, reported it in The Lancet about that date, believed that the whole trunk of the nerve had not been severed, and such a partial injury would of course be more favourably situated for repair than one in which the severed ends of the nerve are separated by a considerable interval as in my case. Dr. Brown-Séquard's experiment shows no doubt the theoretical possibility of the regeneration of a large extent of nerve in animals after excision, and some of the cases in which the functions of a nerve have been regained after excision of a portion of its trunk on account of neuralgia prove that the same result may occur in man. Yet we must allow that such a favourable issue is highly dubious, and in a case like that under consideration, in which a long period has elapsed, and where the upper end of the divided nerve is quite separate from the lower, and its nervous filaments are included in a large bulb of fibrous tissue, any restoration of its anatomical continuity appears hopeless.

I have recently had the opportunity of consulting the Jacksonian Prize Essay by Mr. Bowlby on Injuries of Nerves. As this Essay is not yet published (though it is, of course, accessible to the members of the college), I will not take the liberty of quoting from it, but I may say that Mr. Bowlby thinks that after the atrophy and subsequent regeneration of the filaments of the distal end of the nerve, which we know to take place as a consequence of their separation from the proximal end, there ensues in unfavourable cases a secondary atrophy. If the parts of the nerve be reunited before this secondary atrophy has set in, the operation will probably succeed, but not in the opposite case. This view is both ingenious and probable, and lends much force to the doctrine that in any case in which the symptoms of paralysis are persistent after complete division of a nerve its pieces should be sought for and reunited at the earliest possible period. The fact that spontaneous recovery does sometimes occur after a long period of total loss of function, though indubitable—as in the striking instance above related—is not to my mind any argument against this doctrine, for recovery is very uncertain without operation, while after suture it is both more probable and more speedy. At least such seems the result of our present experience.

I am not able to point to any statistical collections of cases which are really of any great value, for the total number of published cases of secondary suture is not large, and an equally large, or probably still larger, number are unpublished. Thus, in the article on Nerve Suture by Tillmanns, in a recent volume of Langenbeck's Archiv, thirteen cases of secondary suture are tabulated. Of these I should class eight as successful, three as dubious, and two as failures. But in two at least of the successful cases the success, though as much as could be hoped for, considering the time after operation, was not yet perfect. On the other hand, the three dubious cases were reported too soon after the operation to be classed as unsuccessful. Tillmanns' collection, however, is evidently imperfect, for he makes no mention of Mr. Wheelhouse's operation, which is the leading case in this country, and, though not the first operation of its kind, was, I believe, original, as far as Mr. Wheelhouse was concerned, and first called the attention of English surgeons to the subject. Mr. Bowlby's paper contains references to twenty cases of secondary suture, with a much larger proportion of failures, in fact, I believe only six are classed as perfectly successful; but then Mr. Bowlby observes, what is a fatal objection to the value of the statistics of this operation hitherto, that in many of the most successful cases, as in mine above related, the success has been so long delayed that accounts which are published only a few weeks after operation are quite worthless. Thus, in a patient of Mr. Pick, on whom an operation very similar to the one above reported was performed on the musculo-spiral nerve, the operation was thought to have failed, and the lad was discharged, apparently with no benefit. Through the kindness of Mr. Coltart, of Epsom, we have lately ascertained that he has now, like my patient, entirely recovered. Mr. Pick may possibly record the case.

With regard to the time after the injury at which the operation should be undertaken, we are not yet in a position to lay down any certain rules. Obviously, if the parts are quite quiet and the wound completely healed, there can be no motive for deferring the operation, and both the theoretical considerations insisted on by Mr. Bowlby and the practical experience of cases warn us against too long delay. Yet a case is on record in which Mr. Jessop operated on the ulnar nerve with at any rate partial success nine years after its division. I lately united the median and ulnar nerves eight days after the accident, and was led to suspect that it would have been better to have waited till all inflammation in the wound had passed over, or even till the wound had entirely united; but the case is not yet complete, and further experience is wanted on this head. One thing I think we are justified in saying—viz., that there has been no instance hitherto recorded of any harm from the operation—no tetanus or acute neuritis,—and this consideration adds force to the rule now, I believe, generally adopted to unite by suture the ends of all nerves which are seen divided in recent wounds.

A question is often raised in this operation as to the method of passing the sutures, whether through the tissue of the nerve itself or through the sheath only. I think all that we need say on this head is that the sutures should have a firm hold; whether they be passed through the thickness of the nerve or not seems of little consequence. In only one of the thirteen cases above referred to as quoted by Tillmanns was the precaution taken of including only the sheath in the suture. The material of the suture is probably a matter of some importance. Catgut is unirritating, but is not sure to hold beyond a few days, so that it seems a good plan to reinforce the catgut suture with one or two of fine silk (as in my case) or horsehair. It does not seem necessary to remove more than a very small portion of either end of the nerve. In the above instance I purposely took away very little, in order to obviate tension as much as possible. Had the separation between the cut ends been less, I should have liked to excise the whole of the bulb on the upper, and all the wasted part of the lower, end; but I thought it better under the circumstances to remove very little, and the result justified the course adopted.—*Lancet, June* 16, 1883, *p.* 1034.

DISEASES OF THE ORGANS OF CIRCULATION.

6.—ON IDIOPATHIC ANÆMIA, AND ITS TREATMENT.

By Philip H. Pye-Smith, M.D., Assistant-Physician to Guy's Hospital, London.

The appearances after death in genuine cases of idiopathic anæmia are strictly consequences of the condition of the blood. The pale, exsanguine condition of the internal organs is no less striking than that of the skin, the gums, and the conjunctiva during life. The heart, the great vessels of the chest, and the portal veins, contain but very little blood; what there is, is pale in colour, and the clots which it forms are thin and scanty. Occasionally, however, enough blood can be collected to fill a narrow glass, and then, so slow is the clotting, that there is time for the few corpuscles to sink, and leave the liquor sanguinis still paler than before. It seems probable that the albumen and globulins diminish in nearly the same degree as the corpuscles.

Some amount of *œdema* is almost always noticed, from a watery infiltration of the meninges and the lungs to general anasarca, with some amount of passive effusion into the serous cavities. The exuded serum is usually of a deep yellow colour, as if it contained more pigment than usual. Hydrothorax of one or the other side is occasionally seen, and more rarely considerable ascites, or hydropericardium. The presence of shreds of lymph sometimes shows that there has been inflammation as well as dropsy of the pleura.

Petechiæ, whether observed or not during life, can almost constantly be recognised after death, but there is a remarkable absence of cadaveric blood stains (hypostasis).

The body is exceptionally found wasted, even to emaciation, but in the most typical cases subsequent experience has confirmed Addison's description of the remarkable persistence of fat, both under the skin and under the serous membranes. The appendices epiploicæ are especially noted as well preserved. The full yellow tint of the adipose tissue is also remarkable, and the voluntary muscles, instead of being pale and flabby, as in phthisis, are tolerably firm and most frequently of a deep red colour. There are, however, exceptions to this, as in one of my own and in Eichhorst's cases. Fatty degeneration of the diaphragm, abdominal and other muscles, has been noted in several cases.

A remarkable dark grey staining has been repeatedly noticed in the peritoneum, pancreas, spleen, liver, or kidneys. It appears to be due to a sulphide of iron, and careful comparative analyses by Quincke, Grohe, Rosenstein, and Tranchimont, have shown that along with the diminution of hæmoglobin in the blood, the amount of iron in the tissues may be increased. This may, however, be due to the preparations of steel which are often given as medicine.

Addison observed the remarkable interstitial *fatty degeneration of the heart* in the form of zigzag lines across the bundles of fibres—the 'tabby mottling' of Dr. Quain. It affects the ventricles more than the auricles, the left ventricle more than the right, and the papillary muscles more than any other part. This condition was fully described by Wilks in 1857, and by Ponfick in 1873, and is the most constant anatomical condition in the disease. In fact, its absence throws doubt on the genuine character of a case. The cardiac muscle is usually pale and flabby, the cavities occasionally dilated or somewhat hypertrophied, the valves normal. Similar interstitial fatty degeneration has been observed by Wilks, and later writers, in the liver, and less frequently in the kidneys. There is no arcus senilis of the cornea.

Spots of superficial fatty degeneration may be seen (as Virchow observed in chlorosis) in the intima of the aorta and other arteries, and the same change is also stated to occur in the capillary vessels.

That these lesions, and especially the fatty heart, are the result of want of blood is proved from their occurrence in other conditions of long-continued anæmia, and from their artificial production in animals by repeated venesection. The degeneration is probably connected with deficient supply of oxygen.

Treatment.—Most physicians have learned to distrust iron, in whatever doses and under whatever form, as a remedy in idiopathic anæmia. In fact, this is one of the differences between it and chlorosis. Wine, animal food, quinine, and the other so-called tonics have generally proved equally useless.

Phosphorus has been recommended for this as for some other cachectic states of uncertain origin. Like other physicians, I have given it, as I believe, without prejudice, and like others, have not seen advantage from its administration. In one case, in which it was fairly tried for several weeks and in increasing doses, it was thought by the patient to do harm, but this was probably not the case.

Another powerful drug, arsenic, has been used, both in this country and in Germany, in various forms of obstinate anæmia, especially in Hodgkin's disease. In these last cases its administration internally has been sometimes (and apparently with occasional benefit) combined with injection of an arsenical solution into the enlarged lymph glands.

But arsenic is not even mentioned in the monographs of Müller and Eichhorst as a remedy in pernicious anæmia. The merit of using it to good effect in this intractable disease is due to Dr. Byrom Bramwell, who published eight cases in the Edinburgh Medical Journal for 1877. In three of these arsenic was given and recovery followed. Of the rest, arsenic was only given to one patient and he left the hospital shortly afterwards. Dr. Bramwell adds, however, with candour and judgment: "I would not for a moment have it supposed that arsenic will be found a specific for the disease." In three cases treated with arsenic by Dr. Finny, two recovered and one died (British Medical Journal, Jan. 3, 10, 1880). In a case reported by Dr. Haddon (Edinburgh Medical Journal) in 1878, arsenic was given with apparent benefit, but the patient died after leaving hospital, and no post-mortem examination was made.

In my own case, the effect of arsenic was striking and apparently satisfactory. By the patient's own testimony, out of the hospital as well as in the wards, and not less by the observation of others, his symptoms were very decidedly improved under its use; it appeared nevertheless to lose its power when repeated, and did not prevent (though I hope it may have delayed) the fatal result.

The temporary improvement which is one of the not unfrequent features of the disease, might make us distrustful of the effect of any drug; and some of the best established cases of severe idiopathic anæmia have recovered without arsenic, or steel, or phosphorus, or any other treatment.

In my case, as in others, transfusion of blood was practised. Skilfully performed, there is little danger connected with this operation. There is usually a moderate pyrexia which speedily subsides. For the time the patient's appearance and symptoms usually improve, but it is very doubtful whether in these cases transfusion has ever done more than prolong life.

It proved unsuccessful in the hands of Gusserow, Bradbury, and Bramwell. In one of Quincke's cases recovery ensued after transfusion into the radial artery of 80 c.c. of human blood. He recommends this method; and it would seem to be preferable from avoidance of the risk of air entering the veins and of embolism in the great vessels. But Billroth speaks unfavourably of arterial transfusion. Though transfusion of blood was one of the first fruits of the experiments of the Royal Society in the seventeenth century, we still need the help of direct and extended trials of various methods upon animals.

In four cases recovery followed transfusion, beside the one noticed above. In one somewhat doubtful case of anæmia in a man of fifty-six, the improvement seemed to result from giving up treatment and returning to a country life. The same result followed a removal to the hilly country of Silesia in the case of a patient with apparently idiopathic and very severe anæmia under Prof. Frerichs.—*Guy's Hospital Reports*, 1883, *p*. 279.

7.—ON THE ACTION OF IRON AND ARSENIC IN ANÆMIA.

By Fredk. Willcocks, M.D.Lond., Charing-Cross Hospital.

In severe anæmia, either the power of corpuscle formation is almost entirely abolished, or young corpuscles, if formed, have little or no power to absorb hæmoglobin, and consequently do not reach their full development. The comparatively large size, which the hæmatoblasts attain, without the absorption of any appreciable quantity of colouring matter, would go far to show that the embryonic corpuscles are more or less abortive. Iron in these cases is useless beyond a certain point, the existing corpuscles being already overcharged with hæmoglobin. These facts forcibly bear out the hypothesis enunciated at an earlier page, as to the probable hæmatinic action of iron, viz., that it possesses no power of directly stimulating the formation of new corpuscles by any influence on the cytogenic organs, but that it improves the hæmoglobin richness of already existing corpuscles, which are added to the blood by the normal processes. and consequently by improving their physiological value and vitality it indirectly increases their number. Therefore, in cases like those under consideration, where the natural power of sanguification is greatly reduced ,or almost abolished, iron has little or no beneficial effect, since either very few new forms are produced, or, even if they are added to the blood, they have little or no capacity to absorb hæmoglobin and to develop into adult corpuscles.

Chlorosis is in striking contrast to the most severe forms of anæmia, both as regards its blood lesion, and its response to iron treatment. In chlorosis the supply of young, feebly-coloured corpuscles is abundant, and the number of red discs per cubic millimetre may fall in many cases but slightly below normal. The average hæmoglobin richness per corpuscle is greatly reduced, and the curative effect of iron is very rapid. A low average hæmoglobin value per corpuscle is not however peculiar to chlorosis, but is present in the large majority of anæmic cases from all causes. It indicates that feebly-coloured or young elements are being continually added to the blood, or, in other words, that the normal process of globule regeneration is active, the numerical rise preceding the rise in the physiological value of the elements. It is in these cases that iron is indicated. Arsenic was given in two cases of chlorosis, but it had no influence either in preventing relapse on the cessation of iron, or in improving the number or value of the red corpuscles. On the other hand, in the most intense forms of anæmia, with great diminution in the number of the corpuscles and a high relative hæmoglobin value, iron is practically useless, or even harmful, while arsenic, as was seen in one of my cases, may produce a considerable rise in the number of the corpuscles, as well as great improvement in the general symptoms.—*Practitioner, Aug.* 1883, *p.* 114.

8.—VALUE OF ARSENIC IN CERTAIN FORMS OF ANÆMIA.

By the EDITOR OF THE MEDICAL TIMES AND GAZETTE.

A very interesting communication, "On the Arsenical Treatment of Leukæmia, Pseudo-Leukæmia, and Progressive Pernicious Anæmia, with some Remarks on the Mutual Relation of these Diseases," is given by Dr. F. W. Warfvinge, of Stockholm, in a recent number of the Nordiskt Medicinskt Arkiv. It appears that in the space of little more than four years since the Hospital of Sabbatsberg, in Stockholm, has been open, there have been under treatment in that institution no less than eleven cases of progressive pernicious anæmia, and the same number of pseudo-leukæmia, but only two of leukæmia, thus showing that the two former diseases are relatively common in Stockholm, and that they are much more common than leukæmia. The two cases of leukæmia, seven cases of pseudo-leukæmia, and seven of progressive pernicious anæmia were treated with arsenic by Dr. Warfvinge with the following results. One of the cases of leukæmia was of a slightly advanced lymphatic form, and the patient was able to leave the hospital after an arsenical treatment of three months' duration (internally and by injection). He presented all the appearances of perfect cure: the lymphatic glands had returned to their normal dimensions, and the number of white globules was reduced to the ordinary proportion. The other case was of a very advanced splenic form, with an enormous spleen, and the number of white globules was equal to the red ones. The spleen was considerably reduced in size under an arsenical treatment of twelve weeks' duration, the number of white globules was reduced to the proportion of one to ten, and the general health improved at the same time. But the cure was slow, and was only a little advanced when the patient, a feeble girl, sixteen years old, wished to return home. A few injections of Fowler's solution, made in the spleen towards the end of the treatment, were perfectly innocuous.

In the cases of pseudo-leukæmia, the arsenical treatment, which lasted only a few days, was nearly ineffectual in two instances, one of the patients not wishing to remain in the hospital, and the diagnosis in the other being made only a few days before death. In the remaining five cases the result was more favourable. In one of them, in which iodide of iron had been ineffectually administered, and the cachexia and marasmus had reached an extreme degree, the arsenical treatment for five weeks produced a remarkable progressive improvement. At the end of this time the patient presented the appearance of excellent health, had a voracious appetite, very good muscular strength, the spleen was normal, and there were only insignificant remains of hypertrophy of the glands, and, besides, the number of red corpuscles had increased. Unfortunately, six months after the patient had gone home from the hospital into the country, where he lived, he had a relapse which ended in death. In another case the arsenic also produced a remarkable effect on the hypertrophy of the glands. This was particularly the case after arsenical injections into the glandular parenchyma, the effect of which was very striking, the diminution of the swellings being rapid and considerable, but confined to the glands which were injected. The patient, who suffered all the time from asthma, had occasionally severe attacks of suffocation, and died in one of them, caused, as was shown at the autopsy, by the pressure of the mediastinal glands, which were much swollen and had not undergone reduction like those which were reached by the injections. In two other less severe cases of lymphatic pseudo-leukæmia the beneficial effect of the arsenic was unquestionable; the use of this remedy for from three to five months produced a slow diminution of the swellings, and such a decided amelioration of the general health that the patients on their discharge from the hospital appeared perfectly well. In the fifth case, a lymphatic pseudo-leukæmia with marked hypertrophy of the glands of the neck and mediastinum together with general prostration, the internal use of arsenic reduced the glandular swellings and brought about a satisfactory general condition, which has lasted for a year.

Of the cases of pernicious progressive anæmia, one rapidly became worse for a week during which iron was administered: the anæmia and cachexia had decidedly increased, and the number of red corpuscles had diminished; but after the employment of arsenic there was uninterrupted improvement, which was so well marked that at the end of two months the patient, being regarded as cured, ceased to take the arsenic, but on the next day after its discontinuance he was attacked with violent acute nephritis terminating in death. The autopsy proved the total absence of the ordinary signs of pernicious anæmia. In another case the patient came to the hospital almost in a dying state, and died in six days in spite of arsenical treatment; but it appeared that at an early period of the affection there had been a decided improvement on two occasions under the use of small doses of arsenic. In the third case iron had been unsuccessfully employed together with other tonics, but on the administration of arsenic there was a continuous improvement. The red globules in three weeks had been increased threefold, and at the end of four months they were eight times more numerous; but two months afterwards there was a relapse, which again yielded to a fresh employment of arsenic, and health was restored, at least for nearly a year, during which Dr. Warfvinge occasionally saw the patient. In the fourth case the symptoms grew worse under the use of iron, but when the arsenical treatment was adopted there was a gradual improvement: the health returned, and the number of red corpuscles was quintupled. But there was a relapse at the end of about seven months, and arsenic was again employed: health was again restored, and the red corpuscles were increased in number; a persistent diarrhœa, however, compelled the discontinuance of the arsenic, and the patient died from weakness. In the fifth case the malady was increased under the use of iron, and the patient was at the worst when the arsenical treatment was begun, but from that time there was marked improvement: the patient was able to leave his bed at the end of five weeks, and the blood was two and a half times richer; when he left the hospital the number of red corpuscles was about four times more than at the beginning of the treatment. In the sixth case, which was less advanced, iron in large doses produced no effect, but after only eight days of treatment by arsenic the patient began to improve, and presented the appearance of health at the end of five weeks, the number of corpuscles being tripled. In the seventh case the result of the arsenical treatment was equally favourable: the health of the patient was remarkably improved after two months and a half of treatment, and the number of red corpuscles was largely augmented. It appears, however, that the patient died abroad, probably from a relapse. Dr. Warfvinge adds that two cases of pernicious anæmia are still under his treatment, and are slowly but uninterruptedly improving.

Dr. Warfvinge remarks that the fact of these three maladies—pernicious anæmia, leukæmia, and pseudo-leukæmia—being equally benefited by the use of arsenic seems to show a certain degree of relationship between them, and in proof of this position he passes in review the principal symptoms presented and the anatomical and pathological changes, particularly insisting on the change in the blood. Although the three diseases exhibit certain points of difference, there is yet a character common to them all, namely, the diminution of the number of red corpuscles, with a modification of their form and size, the diminution depending less on the decrease in the formation of new corpuscles than on the abnormal destruction of the existing corpuscles. Dr. Warfvinge regards the alteration in the blood as the primary cause of these maladies, and he considers as secondary affections, caused by dyscrasic irritation, not only the changes in the spinal cord, but also the hypertrophy of the lymphatic glands and the spleen, and the lymphatic neoplasms in various situations. The alterations observed in the spinal cord, well known in leukæmia, he has also found in all the cases of pseudo-leukæmia and pernicious anæmia which have been examined after death, and he regards these alterations as common to the three affections, in all of which, moreover, there are anæmia with cachexia, a disposition to hemorrhages, especially of the retina, œdema in various parts and transudations, and fatty degeneration of different organs, especially the heart. The dose of arsenic employed by Dr. Warfvinge was four drops of Fowler's solution given two or three times a day, and four drops of the same daily when used as an injection.—*Medical Times and Gazette, August* 4, 1883, *p.* 128.

9.—ON THE VALUE OF SOME NITRIC, NITROUS, AND NITRO-COMPOUNDS IN ANGINA PECTORIS.

By Matthew Hay, M.D., Demonstrator of Practical Materia Medica, University of Edinburgh.

In a recent number of the Practitioner (see *Retrospect*, vol. 87, p. 160) I gave an account of the successful employment of a simple metallic nitrite, as nitrite of sodium, in the treatment of angina pectoris, and pointed out the advantages obtained by its use as compared with the compounds hitherto employed in the treatment of angina, viz., nitrite of amyl and nitro-glycerine. Since then, I have, in other cases, obtained confirmation of its value.

It will be remembered that the case described exhibited in an unusually well-marked degree the symptoms of angina pectoris, which rendered the successful trial of the nitrite of sodium all the more satisfactory. For the same reason I considered it a case well adapted for the trial of a few other nitrites and some compounds more or less closely related to the nitrites, partly with the object of establishing the correctness of my supposition that the nitrous acid was the remedial part, and partly for the purpose of ascertaining in what form the nitrous acid could be best administered. These trials were made at intervals during the treatment of the case, principally during January and at the beginning of February, when, although the angina was becoming less severe, it was still sufficiently marked to fairly test the remedial power of the substances employed. It is almost superfluous to mention that the administration of the nitrite of sodium was discontinued whilst these trials were being made, and that by desisting from the use of any remedy for a short interval—half a day, or longer if necessary—the angina was ascertained to be still present. At the time these experiments were made the attacks of angina, provided no nitrite was administered, came on at tolerably fixed periods throughout the twenty-four hours—invariably shortly after rising and whilst dressing, occasionally after breakfast, usually after dinner, occasionally in the course of the evening, and, almost without fail, once or twice during the night; besides other attacks at any period of the day when anything occurred to excite him, or when he worked more actively or walked too quickly.

The substances, whose therapeutic value were tested, may be divided into six groups:—(1) Ethereal nitrites, other than nitrite of amyl; (2) metallic nitrates; (3) ethereal nitrates of the type of nitrate of ethyl; (4) ethereal nitrates of the type of nitro-glycerine; (5) nitro substitution-compounds; (6) compounds of amyl, other than the nitrite.

From these experiments it appears that the nitrites derived from the primary alcohols act towards angina pectoris much in the same manner and in the same dose as nitrite of sodium. Although ethereal, they do not possess the great activity of nitro-glycerine. They possess no advantages over the alkaline nitrites, and, certainly, as regards expense and stability, are greatly beneath them.

Effect of Compounds of Amyl other than the Nitrite.—More interest attaches to the action of this group than, perhaps, to that of any other, on account of the amyl having been long regarded as the active part of nitrite of amyl in the treatment of angina pectoris. Dr. B. Richardson, who made several experiments on the physiological action of this and other compounds of amyl, when asked at a meeting of the British Association what was the active constituent of the nitrite of amyl—the nitrous acid or the amyl—gave it, as his decided opinion, that to the latter mainly was to be ascribed the activity of the ether; and this has practically remained until now the opinion of the profession generally. My experience of it goes to show that Dr. Richardson, although not altogether correct in his surmise, is yet not wholly wrong. If the amyl be the active part, then it is to be expected that other ethereal compounds of amyl will produce the same action as the nitrite; for example, the nitrate and the chloride, both of them volatile liquids, possessing similar physical characters to those of the nitrite.

Amyl would appear to possess an action on the circulation and angina pectoris somewhat similar to that of nitrous acid, so that the benefit derived from nitrite of amyl in angina is not wholly due to the nitrous acid, as the action of the nitrite of sodium would incline us to believe, but is in part caused by the amyl.

These are the results of my experiments with various nitrogenous compounds in the treatment of angina pectoris. It may be wondered at that for six or seven weeks a patient was found so willing to submit himself to all the trouble involved. The trouble was not, however, so great as might at first sight appear; for angina pectoris is a disease which yields either at once or not to the remedy tried. One or two trials of the drug in a sufficient dose are quite enough to test its value. Thus, though a number of substances was used, the time taken up by their use, and the consequent interruption to the use of nitrite of sodium—which was his sheet-anchor, so to speak—was not great. Moreover, the patient was quite anxious to assist me, and seemed quite pleased to find in himself such a well-used field of investigation; the more so, as my main object, unless in one or two instances, was to find for him a remedy which would have a more persistent action than the nitrite of sodium.

Briefly stated, the conclusions to be drawn from the present experiments, and from those with nitrite of sodium, nitroglycerine, and nitrite of amyl, reported in my previous paper, are that nitrous acid in any combination, whether as an ether or a metallic salt, is useful in the treatment of angina pectoris; and that, in the case of the nitrite of amyl, the action of the acid is aided by that of the base. On the other hand, all compounds of nitric acid, whether ethereal or metallic, are without effect, unless it so happen that the constitution of the nitrate is such that it decomposes in the body with the liberation of nitrous acid. Further, nitro-substitution compounds have likewise no remedial effect.

So far as at present known, the nitrogen-containing remedies for angina pectoris may be divided into two classes, the one consisting of combinations of nitrous acid with metallic oxides or alcoholic radicals, the other comprising a peculiar class of nitric ethers, obtained from the higher alcohols, whose decomposition within the body results in the production of nitrous acid. In both classes the action of the compound is ultimately dependent on the nitrous acid present. Typical examples of the first class are nitrite of sodium and nitrite of ethyl, and, of the second class, nitro-glycerine. To these classes might be added another containing such substances as compounds of amyl, whose action is similar to that of nitrites. But, limited as this group at present is to compounds of amyl, it is not one to be chosen in the treatment of angina pectoris. The dose required is large, and the action is not rapidly produced, and disagreeable after-effects are apt to occur; and altogether I am very doubtful of its always acting so well as it did in the case of my patient.—*Practitioner, May* 1883, *p.* 321.

10.—ON THE VARIATION AND DISAPPEARANCE OF CARDIAC MURMURS.

By E. Hyla Greves, M.B., C.M., Liverpool Royal Infirmary.

It is now an undisputed fact that, even after a considerable degree of regurgitation, either through the mitral or tricuspid valves, complete restoration to the normal condition of these valves may actually take place; and the same may be affirmed, but to a much more limited extent, of the aortic valve, for the physical conditions present at this orifice naturally offer insurmountable difficulties to the process of restoration. Whether this restoration to the normal condition becomes permanent or not depends upon a variety of circumstances, more especially on the original cause of the lesion, the age, occupation, and mode of life of the patient, and in forming a prognosis these factors must be carefully borne in mind. There is a general consensus of opinion that in cases of anæmia, chlorosis, &c., as well as in general febrile conditions, there is muscular relaxation and general debility, and it is argued with great probability that the muscular substance of the heart is affected in a like manner, for after death in these cases it has been found flabby and relaxed, and in well marked cases of chlorosis, even dilated (from loss of its elasticity), and somewhat hypertrophied. And it is probable that the so-called functional or hæmic murmurs so constantly heard in chlorosis, &c., are due not merely to the spanæmic condition of the blood, as was formerly taught, but to actual regurgitation, brought about by the relaxed and dilated condition of the heart itself, due to malnutrition. These cardiac hæmic murmurs are always systolic in rhythm, and their position of maximum intensity is about $1\frac{1}{2}$ inch to the left of the pulmonary area, and in the same plane, *i.e.*, just over the position of the left auricular appendix. And, in connection with this fact, it is interesting to note that, as Skoda first observed, a mitral regurgitant murmur is occasionally heard only in this area. Naunyn attributes this to the better conduction of the murmur along the course of the regurgitating blood. This view is supported by Balfour and others. The fact, too, that the pulmonary second sound is accentuated in cases of chlorosis, indicates increased tension in the pulmonary artery, and is consequently another proof of the regurgitant origin of these hæmic murmurs. Now, inasmuch as this relaxed and dilated condition of the heart is a curable one, if not too far advanced, it follows that under appropriate treatment not only will the heart be restored to its natural condition, but also that the accompanying murmurs will disappear. The following case is an excellent example of this.

Case 1.—J. C., æt 33, a cook. Admitted into ward 10, under the care of Dr. Davidson, February 15, complaining of general debility, palpitation, noises in the head, and swelling of the legs. Family history unimportant. Has never had rheumatism. Her health has never been robust, and for the last two years she has suffered more or less from leucorrhœa, palpitation, and increasing debility. She has become increasingly pale, and presents now a typically anæmic appearance. Menstruation has been regular, but very scanty. On admission there was slight œdema of the legs and feet, which rapidly subsided after a few days' rest; there was none of the abdomen or face. *Circulatory system.*—The apex beat was indistinctly felt somewhat to the left of its normal position, and on percussion the cardiac dulness was found to be somewhat increased. In the mitral area the first sound is followed by a soft blowing systolic murmur, which can be faintly heard in the axilla. At the base there is a distinct soft systolic murmur, heard loudest in the second left intercostal space, a little external to the pulmonary area, *i.e.*, just over the left auricular appendix; it can also be fairly heard in the aortic area. The second sound is slightly accentuated in the pulmonary area, and diminished in the aortic. There is slight pulsation in the jugular veins, and the ordinary "venous hum" or "bruit de diable" can be distinctly heard at the root of the neck, and also faintly over the mastoid processes and occipital protuberance, the murmur produced in the large cerebral venous sinuses being at these points distinctly conducted to the surface. Beyond slight dyspepsia and constipation, the other systems were normal. She was treated with various preparations of iron, under which she rapidly improved. Two days after her admission the œdema of the legs rapidly disappeared, and in a few weeks the murmurs, accentuation of the pulmonary second seund, and other cardiac symptoms had quite disappeared. The progress of this case clearly bears out what Balfour and others have taught concerning the production of cardiac hæmic murmurs, and I might bring forward several more of a similar nature. It is scarcely necessary to do more than allude to the fact that systolic basic murmurs (especially audible over the pulmonary area, and slightly to the left of it), are very frequently developed during the course of many acute febrile disorders, especially acute rheumatism, all these murmurs entirely disappearing on restoration to health, thus proving that they are not due to permanent changes in the valves or orifices of the heart. They doubtless depend on relaxation of the muscular substance of the heart, due to its depraved nutrition, which allows a certain amount of regurgitation to take place through its orifices, more especially the mitral. As the disease passes away, the blood again becomes normal, the nutrition of the heart improves, and its muscular tissue regains its tone. The orifices are properly closed by the valves, and all the murmurs quickly disappear, unless, as too frequently happens, the valves themselves are the seat of endocarditis, which, of course, generally leads to their permanent deformity.

It is probable that the murmurs occasionally heard in chorea, and which disappear on the subsidence of the disease, are also due to relaxation of the cardiac substance leading to regurgitation, brought about by the impoverished condition of the blood in these cases; and there is scarcely any febrile disease in which murmurs of a similar kind have not been heard; it is necessary to bear in mind, however, that in order to produce a *fluide veine* capable of producing a murmur, a certain degree of force is necessary. It therefore follows that, inasmuch as the heart is so frequently greatly enfeebled in most febrile diseases, notably so in typhus, these murmurs often disappear (and indeed are frequently absent), but reappear as the strength improves during convalescence.

The following *résumé* concerning the disappearance of cardiac murmurs may be useful:—

The above cases illustrate the fact that although murmurs are among the most constant of the physical signs of heart disease, still their presence does not necessarily indicate the existence of incurable lesions, nor their absence that such lesions are not present. In forming a correct diagnosis and prognosis of any case, therefore, too much reliance must not be placed on the presence or absence of murmurs, as is too frequently the case, but other signs and symptoms must receive careful examination and consideration, for often on them alone is it possible to found a correct diagnosis.

The presystolic murmur of mitral stenosis, the most typical of all murmurs, occasionally disappears, the lesion still remaining. Mitral regurgitant murmurs, when due to simple relaxation of the heart's muscle, and dilatation of its cavities and orifices, as in chlorosis and general febrile conditions, in most cases completely disappear under appropriate treatment.

Tricuspid regurgitation is occasionally a temporary condition, due to bronchitis, &c., and when the cause is removed, this condition is recovered from, as is indicated by the disappearance of the murmurs.

Aortic systolic murmurs, due to a permanent lesion at the aortic orifice, may undergo changes in their intensity, but never completely disappear.

Aortic diastolic murmurs in certain extremely rare cases have been known to disappear. In these cases a systolic aortic bruit is always present, which remains persistent, and thus indicates the existence of the lesion.

Pulmonary systolic murmurs are persistent when due to an organic lesion; but, if non-organic, may disappear temporarily or permanently.—*Liverpool Med.-Chir. Jour., July* 1883, *p.* 266.

DISEASES OF THE ORGANS OF RESPIRATION.

11.—ON INHALATION AND DISINFECTION, WITH DESCRIPTIONS OF NEW FORMS OF APPARATUS.

By Arthur Hill Hassall, M.D.Lond., late Senior Physician to the Royal Free Hospital, &c.

In the Lancet of the 5th of May last I stated the results of certain experiments made with some of the principal of the oral and ora-nasal inhalers now in use, and I showed that after the completion of one and even two hours' inhalation more than four-fifths of the antiseptic substances usually employed, as carbolic acid, creasote, and thymol, were recoverable from the sponge or cotton-wool of the inhaler. I pointed out that there were several ways in which the small loss which had taken place might in part be accounted for, without its being supposed that the antiseptics had really made their way to the seat of the disease in the lungs themselves. I have since continued my investigations and made many further experiments bearing on the subject of inhalation. In a paper communicated to the British Medical Association at its recent meeting at Liverpool, I gave the results derived from certain trials and experiments made with some of the chief air and steam sprays, and I showed that in the case of the sprays also a very large proportion of the antiseptics employed were recoverable; the inference being that, except in the case of throat affections, they were but little more effective than are the oro-nasal and oral inhalers, as at present constructed and used. In the same communication I detailed the results of experiments with an apparatus devised in imitation of natural respiration; these proved that, using the oral and oro-nasal inhalers and the air and steam sprays as at present practised, not more than traces of the antiseptics used made their way into and were to be detected in the water or spirit contained in the receiver, or Woulfe's bottle, placed at the end of the trachea of a recently killed sheep. (For further details in reference to these experiments the reader is referred to the paper above alluded to.) Recognising the inefficiency of the means now resorted to, for introducing into the lungs various antiseptic and other curative substances by means of inhalation, I was led to consider whether it were not possible to charge the air of a chamber with the required medicaments, and these in the proper amounts, and I have communicated my observations and experiments under this head to the British Medical Association in a second paper.

Without entering into details, I may here state that I have arrived at the conclusion that such a charging of the air of chambers is really practicable, an object which has not, so far as I am aware, been hitherto accomplished. For effecting this purpose I rely on two principles: one is the greatly increased volatilisation of certain chemical substances, which at the ordinary temperature of the air are but little volatile, obtained by spreading the substances over a very considerable surface, and exposing them either in the air or on water. To show the effect of this principle, I may mention that 50 grammes, or 770 grains, of carbolic acid, exposed to the air on a rough and moistened fabric, having a superficies of eight square feet, had disappeared, and were entirely lost at the end of thirty hours. Now, had the same quantity of the acid been exposed to the air in any vessel presenting only a small surface, the loss would have been but trifling, and in fact the weight of the crystalline acid would have become increased by the formation of the liquid hydrate. The second principle is the augmented evaporation obtained by increase of temperature in combination with extension of surface. Armed with these two principles, applied in a practical manner, we possess the means, as I have said, of charging chambers with medicaments to any required extent, and of forming true inhalation chambers. The second paper already referred to, dealt mainly with the principles of the construction of inhalation chambers, and did not enter into any definite description of the means to be employed; these details were left for further observation and inquiry.

I now proceed to give the necessary data on which the methods to be used are based, and to describe the apparatus I have devised. A piece of Turkish towel 16 by 11 inches, giving a superficies on the two surfaces of 352 inches, was moistened with 100 cubic centimetres of water, containing 100 grains of carbolic acid. Six of such pieces were similarly treated, suspended on glass rods, and the amount of carbolic acid contained in them determined at the end of each successive hour; the quantities recovered were 82·79, 75·49, 63·89, 57·02, 48·73, and 41·39 per cent. These figures show a progressive loss each hour of 17·21, 24·51, 36·11, 42·98, 51·27, and 58·61 per cent. Thus, if the six pieces had all remained suspended for the six hours, of the 600 grains of carbolic acid used in charging them, no less than 350 grains would have disappeared, or more than one-half. Six cloths of the same dimensions were next taken, each being moistened with a mixture of spirit and water in equal parts, containing 120 grains of creasote; the entire quantity in this case for the six cloths would therefore be 720 grains. There were recovered at the end of each successive hour the following amounts: 103·5, 86·8, 83·7, 80·8, 72·0, and 66·0, showing a loss of 16·5, 33·2, 36·3, 40·0, 48·0, and 54·0. Thus, of the 720 grains taken, no less than 324 grains would have disappeared had all the cloths been suspended for the six hours. Lastly five cloths were each moistened with a mixture of spirits of wine and water, in equal parts, containing 5 grammes of thymol = 77 grains; these cloths therefore contained 25 grammes of thymol, or 385 grains. The following amounts were recovered each hour: 4·74, 4·44, 4·08, 3·88, 3·12 grammes = 73·0, 68·3, 62·8, 59·7, and 48·0 grains respectively, the loss for each cloth in grains standing thus: 4·15, 8·78, 14·30, 17·4, and 29·15 respectively.

Here again the loss is very considerable, although not so great as in the two previous cases. Had all the cloths been exposed the whole time, the loss would have amounted to 145 grains out of the 385 originally taken. A considerable loss, of course, also takes place in the case of other but little volatile substances, exposed in the same manner on an extended surface, dissolved, if necessary, in suitable menstrua, the extent of the loss being proportionate to the natural volatility of the substance and its solubility. If the loss is so great resulting from the exposure of such a limited superficies as is afforded by a suitable fabric of 16 by 11 in., it is obvious that by extending the surface we possess a most powerful means for charging the air of a chamber with any required medicament, although it may possess only a feeble volatility at ordinary temperatures, and this to any extent required. But there is still another means whereby the same result may be aided or accomplished—namely, by exposing the substances on a comparatively extended surface of water, or even by dissolving them in it, raising and maintaining in some cases the temperature of the water at certain fixed degrees.

The following figures will serve to show the results obtained by this proceeding. Two grammes and a half of carbolic acid were dissolved in 150 cubic centimetres of water, and placed in a small glass dish having a superficies of eight inches; five other dishes were similarly charged, and all were floated on a water-bath, the temperature of the liquid in the dishes being maintained at about 74° C., or 165° F. And here I would remark that the temperature should always be taken of the liquid in the dishes themselves, and not in the water in the outer bath, as there is often a difference of 6° to 8° between the two, according to the nature of the vessels employed. The quantity of carbolic acid therefore contained in the six dishes amounted to 15 grammes, or 231 grains. The amounts recovered were 1·838, 1·470, 1·116, 0·868, 0·661, and 0·511 = 28·3, 22·6, 17·2, 13·3, 10·1, and 7·8 grains respectively. It thus appears that of the 38·5 grains originally present only 7·8 grains remained at end of the six hours. It follows therefore that of the 231 grains originally taken all but 47 grains would have been dissipated had all the dishes been exposed for the same length of time, equivalent to more than three-fourths. With similar quantities of creasote—namely, 2·5 grammes—for each dish the results stand as follows:—In the first experiments the creasote was allowed to remain at rest, the greater part sinking to the bottom, it being only partially soluble in water, and part floating on the surface. There were recovered successively 1·245, 0·894, 1·10, 0·51, 0·21, and 0·37 grammes, = 19·17, 13·76, 16·94, 7·85, 3·23, and 5·69 grains. Thus, in this case had the temperature of all the dishes been maintained for the six hours, no less than 197 grains would have disappeared out of 231 grains originally taken.

When, however, the contents of the dishes were stirred occasionally with a glass rod, whereby the heavier portions of the creasote, which had fallen to the bottom of the dishes, became broken up and dispersed, the loss was still more considerable, as indicated by the following figures—0·76, 0·62, 0·43, 0·13, 0·035, 0·00,—11·70, 9·54, 6·62, 2·00, 0·54 grains, while from the last dish the whole of the creasote had disappeared. The experiments with thymol furnished results almost equally striking. The substance is soluble only to a trifling extent in water, and when exposed to the air at ordinary temperatures, although it gives off its pleasant smell freely, it scarcely loses weight at all; thus, 15 grammes exposed to the air were found to have lost only the most trifling amount at the end of a fortnight. But thymol melts rapidly in hot water, and, being lighter than water, floats upon and spreads over its surface in a thin scum, and in this condition it becomes rapidly volatilised, as will be apparent on an examination of the annexed figures. 2·5 grammes being added to each of the six dishes containing the usual amount of water, the temperature of which was maintained at 74° C., the following amounts were recovered:—1·82, 1·23, 0·874, 0·64, 0·36, 0·096 grammes = 28·02, 18·94, 13·46, 9·85, 5·54, and 1·47 grains.

Thus, had the experiments been continued with all the dishes for six hours, the loss would have amounted to 123 grains out of 131 taken at the commencement.

Armed with these principles and data I have been led to devise the following forms of apparatus, the first two being intended for charging the air of chambers for inhalation and disinfection. The first of these, which I have named the "chamber inhaler and disinfector, No. 1," consists of a long fabric woven so as to afford a very large extent of surface for evaporation. The length and breadth of this vary with the extent of the effect required to be produced. This is spread out in several tiers one above the other, by means of an arrangement consisting of a double series of rails which are attached to a box, and which lift out and in. These, when not in use, are packed away in the box, which also contains a tray to catch any drippings, and a tin box to receive the longcloth.

A second apparatus, the "chamber inhaler and disinfector, No. 2," consists of an outer water-bath to which a thermometer is attached, and an inner porcelain dish divided into four parts. The divisions of this are also filled with water, the temperature of which, by means of the outer bath, can be regulated and maintained to a nicety. With this apparatus, if desired, no less than four antiseptic or other substances may be used at the same time, either for inhalation or disinfection. It combines the advantages of moderate extent of surface with a temperature augmented, but regulated according to the nature and composition of the substances used—a very valuable combination. No hospital should be without one or more of these powerful disinfectors, especially the No. 1 "chamber inhaler and disinfector." It will also be found of great service in private houses in cases of infectious disease. In using them one important fact must be borne in mind—namely, that it is not possible to charge the air of any ward or room with any medicinal substance or disinfectant while the doors and windows are open, as of course any amount of the substances which may be eliminated will be too rapidly dispersed to be of any service. It is not possible therefore to combine either effective inhalation or disinfection with free ventilation.

It occurred to me that some, at all events, of the advantages gained by increasing the surface of exposure might be obtained by applying the principle of extension to the construction of oro-nasal and oral inhalers, and with this object I made a variety of experiments. Without giving in detail the results of these, I will now describe two inhalers I have devised, the "globe" oro-nasal inhaler, and the "globe" oral inhaler.

That the inhalers at present employed are defective in construction in many ways, and are all but useless in practice, particularly in chest affections, has, I think, been sufficiently demonstrated. One defect is that, as a rule, they are not accurately adapted to the contour of the face of the wearer, so that air enters freely through other than the proper channels. Another is, that the amount of the substances used is generally much too small, and this is also the case with the materials on which these are placed; then the nature as well as the size of the materials selected, such as sponge or cotton-wool, are but ill-suited to the object in view, since they hold but a few drops of liquid, and even these are sufficient so to clog them as to render them more or less impermeable to the air, which should pass in all directions freely through them. In fact, the physics of the right construction of oro-nasal and oral inhalers have been even less studied than has the chemistry of the substances employed. The "globe" oro-nasal inhaler consists of a covering for the nose and mouth of a material which, becoming flexible in hot water, may be accurately adapted after it is made to the contour of the face of the wearer—a point of great importance with all oro-nasal inhalers. To this is attached a light glass globe, which is filled with a suitable material packed so lightly as to allow of its ready permeation by the air drawn through it in inspiration. This is then charged with the medicines desired to be employed. Supposing carbolic acid to be used, the quantity would be from 1½ to 2½ grammes = 23·14 and 38·57 grains, partially dissolved in 8 c.c. of water = 2 drachms. The extent of the loss of this antiseptic varies according to the amount of the acid taken, the care with which the globe is charged, the greater or less vigour with which the act of inspiration is carried on, and the length of time occupied in the inhalation. When 2½ grammes are used and the inhalation continued for two hours the loss varies from half to one gramme, or 15·4 grains.

Although I have repeatedly used my "globe" oro-nasal inhaler with a charge of 2½ grammes of carbolic acid and have inhaled for two hours at a time, I have never experienced any decidedly ill effects, still I would recommend that the quantity used to begin with should not exceed 1½ gramme. The Pharmacopœial dose of carbolic acid for internal administration is one grain only. What portion of the amount of the antiseptic which disappears actually makes its way into the lungs has yet to be determined, but there is no question that, with my apparatus, much of it does really enter the system, part of it being absorbed by the mucous membrane of the mouth and fauces. A little, no doubt, is lost on the skin, and when a moustache or beard is worn, upon it as well. While using this inhaler the carbolic acid may be strongly smelt and tasted, and in a short time the skin of the lips becomes whitened and a tingling sensation may even be experienced in them; these last effects are produced wholly by evaporation, as, although the quantity of water or other menstruum used is several times larger than that employed in ordinary inhalers, not a drop ever escapes from the inhaler to the mouth, as so often occurs with most other oro-nasal inhalers. The last apparatus, the "globe" oral inhaler, consists of a glass globe with, on the distal side, an aperture and cribriform plate for the entrance of the air during inspiration, and on the near side a flattened tube for the mouth, guarded by a valve, which prevents the air being discharged into the globe during expiration. The nose is uncovered, the flattened tube only enters the mouth, and the air is drawn through the globe in the same manner as through a cigar or pipe. By the use of this inhaler, the objection so often urged against oro-nasal inhalers is removed: that by covering the nose and mouth they restrict the entrance of the air and greatly impede respiration; moreover, its employment is far less irksome and fatiguing; it may be taken up or put down in a moment, and when once charged it may be used for one or two days, in most cases without requiring to be refilled. The ordinary quantities of carbolic acid for this inhaler are the same as those for the "globe" oro-nasal inhaler. All persons do not use oro-nasal inhalers alike; some inhale simply by the nostrils and close the mouth during inhalation, others inhale by both the nose and mouth, and this is the best way, since the mouth being open, a portion at least of the medicaments used make their way directly to the throat without having to take the longer and more tortuous course, with the inevitable result of part of the substances becoming absorbed. The "globe" oral inhaler has therefore a distinct advantage over the "globe" oro-nasal inhaler in that the whole of the medicaments pass at once into the mouth, none being lost on the skin of the face and lips, on the moustache or beard, or in the convolutions of the nares.

I have communicated all the necessary particulars to Mr. Banks, of the firm of Messrs. Maw, Son, and Thompson, respecting the four different kinds of apparatus above described, and he is now having them constructed. The firm will therefore, I hope, be prepared to supply them very shortly.—*Lancet, Oct.* 6, 1883, *p.* 580.

12.—ON NITRITE OF AMYL IN URÆMIC ASTHMA.

By Solomon C. Smith, M.D., Surgeon to Halifax Infirmary.

Within the last month, two writers in the Journal have testified to the usefulness of nitrite of amyl in allaying the paroxysms of uræmic asthma. There is no doubt about its efficacy; but it is too potent a remedy to be used without great care. Its very power is its danger; for it often gives such relief, even in desperate conditions, that a feeling of false security is apt to be engendered, the gravity of the case being put in the backgronud by the comfortable feeling that relief can always be obtained; and thus, instead of the asthma being accepted as a most urgent warning of danger, the facility of getting relief is taken as a permission to throw aside restraint. On this, Dr. Sheen's case (British Medical Journal, April 28th) is a good example. The patient got relief by means of the amyl; then refused further treatment, and died.

Considerable latitude has been allowed in the use of the term asthma, it being often applied to conditions which resemble it in one thing only, that is, in the difficulty of breathing. True asthmatic paroxysms do, however, occur as a result of renal disease, but they form only one species of uræmic dyspnœa. It has seemed to me that, putting on one side cases of pleuritic and pericardial effusion, the attacks of dyspnœa which occur in the course of disease of the kidney may be roughly divided into four groups, in only one of which is nitrite of amyl of much service.

1. True asthma, spasmodic, passing entirely away between the attacks, unaccompanied by signs of cardiac weakness, often produced by errors of diet, and indistinguishable from ordinary spasmodic asthma, except for the discovery between the paroxysms of symptoms of chronic kidney-disease.

2. Exceedingly rapid breathing, with sensations of breathlessness, but without any obstruction to the respiration, without wheezing, and without apparent effort. This, in a minor degree, is one of the ordinary early symptoms of kidney-disease, but is sometimes so aggravated as to seem to stand out by itself as a disease apart. Neither of these conditions has appeared to me to be at all markedly under the control of nitrite of amyl.

3. Cardiac dyspnœa, due to the failure of the heart; a sign that degeneration of the cardiac muscle is taking place, and that hypertrophy is no longer truly compensatory, an urgent warning that the mode of life must be altered, so as to bring the demands upon the heart within its lessened power. The attack generally occurs in the night. There are orthopnœa, a sense of suffocation, and a feeling of being in danger of death, unless something can be moved from the chest; the hands are cold and clammy; the face bathed in perspiration; the heart's action is laboured and irregular, but the arteries are almost pulseless; the muscles of deep respiration act forcibly, and air freely enters the lungs; but this gives no relief to the miserable sense of apnœa, which goes on sometimes for several hours,

until, towards morning, a little frothy expectoration occurs, often tinged with blood, and the breathing gradually becomes less difficult. At this time, patches of fine mucous *râles* can be heard in the lungs, which persist for perhaps twenty-four or thirty-six hours, during which period the breathing remains somewhat hurried, but after then the patient often appears fairly well. When these paroxysms occur at comparatively long intervals, they generally seem to be brought on by cold, or fatigue, or indigestion, and are usually regarded as asthmatic; but sometimes they are repeated so frequently, that the patient is never quite free, and then they become what is in fact a mode of death. In either case, it is most essential that their meaning should be recognised as pointing to the heart.

These are the cases in which nitrite of amyl most distinctly shews its power. During its inhalation, the pulse fills out; the limbs become warm; the breathing is relieved; and the misery passes away; but it is most important that the rapidity with which ease is obtained should not be taken as proving the neurotic origin of the attack. The case is not one of asthma, but of failing heart; hypertrophy has done what it can; and is no longer able to overcome spasm of the arterioles; the patient has come to the end of his tether, and now must be content to draw in. An isolated attack of this form of uræmic dyspnœa sometimes gives a warning far ahead, and makes it possible to adopt in good time such a course of treatment as enables life to be prolonged often for a very considerable period—a broken life, no doubt, and one lived out upon a lower platform, but still better than the alternative. If, on the other hand, the warning be neglected, and the treatment be limited to the use of such doses of amyl or nitroglycerine as suffice to keep down the attacks, the quantity of the drug required rapidly increases, and it is soon found no longer to produce the desired effect.

The true place of nitrite of amyl in these cases is not as a treatment in itself, but as a means of giving quick relief to the distressing symptom. When this has been done, then a course of treatment for the disease must be arranged. This should generally include a life free from worry and excitement; careful protection from cold; the use of such baths and frictions as are found to keep the skin in good order; sufficient daily exercise to ensure good digestion; a diet regulated according to the digestive power, and the requirements of the body; the use of aperients, especially when bad weather prevents exercise; the steady employment of small doses of iron and digitalis, interrupted as may be found necessary for the treatment of those catarrhs and indigestions which are the chief breaks in the monotonous progress of these cases; and then, if from some exposure to cold, or mental excitement, or error of diet, attacks of dyspnœa should recur, nitrite of amyl will again be of use as before, as a means of getting relief from the urgent distress.

4. Bronchitis, congestion of the lungs, and pulmonary apoplexy, give rise to great difficulty of breathing, which sometimes comes on so suddenly as to look like an asthmatic attack; but there are generally ample physical signs to distinguish it from other forms of dyspnœa. Although these conditions are often associated with dilatation of the heart, the block is too organic to leave much room for the action of nitrite of amyl.

Of the four groups, then, into which cases of uræmic dyspnœa may be arranged, in one only is nitrite of amyl of much service. In that class, however, its beneficial action is most striking, and it stands almost alone in the rapidity with which it gives relief to the breathing. It must, however, be used with both caution and intelligence; otherwise, instead of giving an opportunity for useful treatment, it may only mask the progress of the disease, and while easing painful symptoms, merely lead the patient on to euthanasia.—*British Medical Journal, June* 9, 1883, *p.* 1115.

DISEASES OF THE ORGANS OF DIGESTION.

13.—GOOD REMEDIES OUT OF FASHION.—EMETICS IN BRONCHITIS, STOMACH DERANGEMENTS, &c.

By Charles J. Hare, M.D.Cantab., F.R.C.P., &c., London.

Sometimes with us not only do things come into, but they also go out of fashion; and remembering as I do the days of yore, I think that, deluged as we now are with so-called new remedies, such as hydrastin, iridin, sanguinarin, baptistin, glonoin, gelsemin, euonymin, mucuna, muscarin, the quack chlorodyne (of which I never in my life prescribed a single dose), eucalyptin, thymol, ingluvin, asclepedin, and a host of others, the advertisements of which fill the pages of our journals, I think that some valuable plans of treatment have been allowed to fall into disuse, and that there are such things as "good remedies out of fashion."

It is not long ago that, in a very urgent case of bronchitis, I advised the administration of an emetic; when the gentleman whom I had been called to meet in consultation said, "Why, I never gave an emetic to an adult in my life." In former times, it was not unusual, on the contrary, to commence the treatment of many diseases with the administration of a dose to procure vomiting; and although the remedy might then be given sometimes indiscriminately and according to routine, only those who have seen the effects of emetics, properly and judiciously given, can conceive the beneficial effects they sometimes produce. In the early stage of an attack of croup, it was by no means unusual to give an emetic of tartarised antimony or of ipecacuanha ; and it is in accordance with the recorded experience of some of the best authorities and most practical men, and quite consonant with my own experience too, that symptoms which presented the most certain augury of a severe attack were by these means cut short, the hoarse voice resumed its natural character, and the feverish symptoms were in a few hours relieved. I know quite well that a great fear is entertained by some as to the depressing effects of emetics; but the fear is theoretical, and not practical, and those who have had most experience in the administration of them best know how groundless the fear is. In diphtheria, too, I have seen the false membranes which are out of the reach of local remedies, and which the patients cough and cough in vain, and utterly exhaust themselves to get quit of, readily brought up by the action of vomiting, to the immense relief of the sufferer.

In suffocative bronchitis, the effect of emetics is sometimes magical, and by their administration in such cases not only is immense relief given, but I verily believe—I am certain—that lives are saved. You are called to a patient who has been ill a few days, with increasing dyspnœa ; she is sitting up in bed (I draw from nature), for to lie down is impossible; she is restless, and tossing about; the lips, and indeed the whole face, blue ; the eyes watery and staring; the pulse quick and small; the cough constant; the expectoration semi-transparent and tenacious ; over every square inch of the chest, front and back, from apex to base, you find abundance of rhonchi; moist, sonorous and sibilant ones in the upper part of the lungs, and muco-crepitant or mucous *râles* towards the bases. Ammonia and stimulants, right and good in their way perhaps, in such a case are too slow in their action; the patient is, in fact, more or less slowly, more or less rapidly suffocating. An emetic of twenty-two grains of ipecacuanha in an ounce of water is given; in ten or fifteen minutes, the patient vomits and brings up a huge quantity of that tenacious mucus, and the whole aspect of the case is altered; the distressed countenance is relieved ; the breathing is at once quieter ; and the patient is able for the first time for the past twenty-four hours to lie moderately low in bed, and to get some sweet refreshing sleep. The patient is, in fact, rescued from the extremest peril, and in this case, and in many similar ones too, I believe, from otherwise most certain death. Of course, in such cases the emetic is not given for its effect on the stomach, but for its collateral effect in mechanically clearing out the enormous amount of secretion which accumulates in the bronchial tubes, and which the patient is otherwise quite incapable of getting quit of; and thus the half-choking, almost asphyxiated, condition is changed for one of comparative comfort, and time is gained for the action of other appropriate remedies. No doubt the secretion may, and often will, accumulate again; and I have not hesitated again in bad cases to repeat the same good remedy; but it is a fact, and a very positive one too, that, quite contrary to what those who have had no experience in the plan suppose, the system rallies instead of being more depressed under the action of the remedy; and, in the language of one who had had thirty years' experience in the beneficial effects of ipecacuanha in emetic doses, it is, so administered, "a powerful restorative in some cases of exhaustion and sinking." (Higginbottom, Lancet, 1845, June.)

My object is not to write an essay on these remedies, nor even to name all the cases in which they may be useful; such as where certain poisons have been taken, or where it is certain that a mass of hard and non-digested food gives rise to intense cramp and horrible pain in the stomach. In such cases, I have no doubt anyone would use so obvious a remedy, notwithstanding the statement of my friend above alluded to, that he had never in his life given an emetic to an adult. But I would wish to mention the great use of which they are in the commencement of the treatment of many (perhaps most) cases of delirium tremens; for they often themselves quieten the patient, and even produce, after their immediate effect, sleep; while I firmly believe they materially curtail the duration of the disease, and render the effect of the other remedies more speedy and potent. It is consonant with experience and reason, that the absorption of remedies from a well cleaned-out stomach should be more rapid and efficient than when the stomach is full of half-digested food, and the coats covered with a morbid tenacious mucus; and, as a matter of fact, I know that, when opiates given largely have failed to produce the longed-for sleep, a moderate dose has had the desired effect after the free action of an emetic.

There is one form of stomach-affection or derangement, accompanied with much nausea and frequent vomiting, which is relieved, or rather cured, by the action of an emetic, with a rapidity and a certainty which attends no other remedy, or remedies, or plan of treatment whatsoever. A lady, aged 34, moderately stout, not specially unhealthy looking, but with her complexion far from clear, had been ailing with various symptoms of indigestion for a couple of months; and for that time had been under the care of two medical men. She had considerable pains, of dull, heavy character, both at the epigastrium and between the shoulders, and these had rarely left her during her illness; but the discomfort was notably augmented after food of any kind. The eructations preceding the sickness were often very abundant. She had scarcely any appetite whatever. She had much and constantly recurring nausea, and, for nearly a month, had *not passed one single day without vomiting.* The sickness often came on suddenly, sometimes after food, but very frequently when no food had been taken, She always brought up more or less of a ropy mucus, and very frequently, especially towards the end of the retching, the ejecta were very acid; often the quantity brought up was very small, though the retching might be long-continued. There had been no hæmatemesis, and the vomited matter had not presented any sarcinous characters. I wish particularly to observe, that both the nausea and her headache, which was one of her very distressing symptoms, were always relieved for a time by the vomiting. This "sick headache," though affecting the whole head, was almost always most acute in one or the other temple, where it occupied the space of a half-crown or crown-piece, and was accompanied by a distressing throbbing of the same part. The various remedies she had taken had entirely failed to influence her condition for good, and, so far as her chief symptoms at least were concerned, had been entirely ineffectual. Not to trouble you with a further detail of symptoms, I may add that, on further examination, I satisfied myself that there was no ulceration of the stomach, nor any other organic disease. The renal functions were practically right; there was no extraneous cause to account for the persistent sickness and the other accompanying symptoms. In fact, this fell into the category of cases of which I have seen scores, and which are, doubtless, perfectly familiar to every one here present. Well, under these circumstances, I ventured with confidence to promise her that she should be sick only once more—namely, that evening; and that, on that occasion, the sickness would be of my producing. Accordingly, I prescribed for her an emetic of twenty-two grains of ipecacuanha; and directed that she should take nothing whatever after the draught until she had been at least once thoroughly sick. She was then to drink a tumblerful or two of warm water, which would also before long be brought up, and would thus wash out pretty completely the stomach. An hour after that, food, in the form of boiled milk, might be taken. All this was done. A large amount of the ropy mucus and intensely acid secretion, to which I have already referred, was vomited; and, though she remained under my observation for about three weeks, she had not one single return of the vomiting. The pain between the shoulders, and that in the head, were removed; and she was practically cured by that single dose.

Now, in these cases, the sickness, I believe, depends upon the stomach secreting a morbid matter, which, on the one hand, causes fermentation of whatever food is put into it; and, on the other, by its irritation of the sympathetic system, causes the reflex headache—paradoxically speaking, the patients may be said not to have a headache, but a "stomach-ache in the head." Nature, then, tries to get rid of the irritating secretion, and so causes the patient to vomit. The action is, however, only partially effective; but, for the time, the patient gets notable relief from all the symptoms, only, however, that they may recur again when more of the ferment is secreted by the stomach, and when fresh food is taken. Now, the emetic does thoroughly and efficiently what Nature for, perhaps, a month past, has been trying to effect; its action is mainly, in the curative point of view, mechanical; the stomach is not only emptied of the morbid secretions it contains, but the gastric follicles are thoroughly squeezed out, and, no more ferment remaining, no more sickness occurs. I have cured a vast number of cases (for, as I have said, they are very common) in this way; the plan is reasonable, and, in right cases, it is very sure. It is not an instance of *similia similibus curantur*, as might at first glance appear to be the case, but exactly the reverse; if we acted on that principle, we should give remedies to increase the morbid ferment; but in this we give a remedy which removes the cause, and forthwith the effect ceases. The yeast is thoroughly cleared out of the vat, and new wort being put into it, no longer has the fermentative process set up.—*British Medical Journal, July* 28, 1883, *p.* 151.

14.—STEWED FRUIT FOR THE GOUTY AND DYSPEPTIC.

By J. Milner Fothergill, M.D., Physician to the City of London Hospital for Diseases of the Chest, Victoria Park.

For many persons—gouty, dyspeptic, and glycosuric—ordinary stewed fruit is objectionable from the amount of added sugar it contains. Where the acidity of fruit is masked or hidden by an excess of sugar, then the resultant product is cloying to many palates, and offensive to many stomachs. But it is by no means necessary to render stewed fruit objectionable by adding much sugar to it. Deprived of this excess of added sugar, stewed fruit can not only be rendered unobjectionable, but be converted into an actual prophylactic measure, especially in cases of lithiasis. In order to attain this end all that need be done is to neutralise the excessive acidity by an alkali, and then little or no sugar is required. Thrifty housewives have long been familiar with the fact that the addition of a small quantity of the bicarbonate of soda to stewed fruit reduced the acidity, so as to save the necessity for much sugar. This was done simply for economy. The principle has a far wider application. Last June I was requested to visit a lunatic in the Midlands who was also gouty; and when the gout was acutely present she was more excitable and violent than usual. No medicine would she take, but she was very fond of stewed fruit. To add potash to her stewed fruit was very easy, yet very effectual. After this I gave my cook instructions to perform a series of experiments for me with all our ordinary native fruits. The result of this was that the amount of bicarbonate of potash required for each pound of fruit was found to be about as much as would lie upon a shilling. And this is a much better guide for a cook than to put so many grains. With all fairly ripe fruit this was just sufficient to neutralise the acidity, and bring out the natural sweetness; indeed the resultant product was quite sweet enough for most adult palates. Such stewed fruit could be eaten alone, or with milk puddings, or with cream, or the Swiss milk in bottles. Gooseberries, currants of all kinds, apples, and plums, all alike were excellent when so prepared. There are some points, however, to be attended to in practice, which are of more or less importance. The first matter is this: with dark fruits, as the black plum, for instance, the colour is impaired by the alkali, and the fruit is less attractive to the eye than is that of the ordinary stewed fruit, which is of a deep clear crimson. This matter is easily got over: a little cochineal will give the desired colour. Another is this: where there is no natural sweetness to neutralise the acid completely by an alkali leaves nothing, simply a cold mass, to which the palate is absolutely indifferent. Such is the case with rhubarb. Here it is well to use half or all the amount of alkali with some sugar. The same is the case with early gooseberries before they have any natural sweetness; no sugar formed in them. Here the full quantity of alkali should be used, and the remaining acidity met by sugar. Where three-quarters of a pound of sugar is required to sweeten one pound of fruit, only one-quarter of a pound of sugar is necessary after the alkali has been added. The sour-sweet taste is thus secured, which is toothsome. Now, in these two instances the stewed fruit is only rendered less objectionable to the stomach plagued with acidity, not made quite inoffensive. But for ordinary gouty individuals not troubled with acidity of the stomach, such stewed fruit is quite admissible, and forms a pleasant method of taking potash. The whole subject is one which deserves attention from invalids as well as their medical attendants, as it opens up to many a new field of diet altogether. Fruits *au naturel*—as the strawberry, for instance—are good in gout from the salts they contain, and are unobjectionable stewed, if it were not for the acetous fermentation of the added sugar. Here soda may be used. But where there is lithiasis the alkali ought to be potash. The gouty and the bilious alike are troubled with the products of the metamorphosis of albuminoids. Neither the lithates of the gouty nor the bile acids of the bilious are derived from the saccharine or farinaceous elements of the food. It was possible to make bricks without straw, but it is impossible to make bricks without clay! No liver can make these nitrogenised substances from simple hydro-carbons: it is physically impossible! The dietary for each is the same—a non-nitrogenised dietary, in which vegetables and farinaceous matters are indicated, and saccharine matters, too, unless acidity in the stomach is produced by them. Milk puddings and stewed fruit are excellent for the dyspeptic, the bilious, and the gouty, as my experience tells me; and for one of those who suffers from taking sugar nineteen would be all the better for stewed fruit. But for those who dislike sweets, and for those who suffer from acidity, it is well to prepare the stewed fruit with alkalies, completely and solely or partially; as the case may be. This may sound very heterodox to some readers; but just let the incredulous test the matter for themselves.

Now, there are two other matters remaining to be alluded to, on which it is impossible to speak dogmatically or *ex cathedrâ*; they are, rather, matters of personal belief, and they are these: —1. It does not seem a matter of indifference in lithiasis what forms of albuminoids are taken. The flesh of animals is rather converted into peptones by pepsin in an acid medium—that is, by gastric digestion—than by trypsin in an alkaline medium. And such peptones seem specially liable to form lithates. Caseine is more specially digested by trypsin in the intestine, and such caseine peptones seem less readily converted into lithates; the clinical fact being that a milk dietary or a pulse dietary is good for the subjects of lithiasis. Caseine is the form of albuminoid, it seems to me, best suited to the gouty. Milk or milk puddings (made without eggs) are capital food for the cholæmic or the lithæmic. These fibrin-albuminoids, digested by pepsin, are laxative, while caseine is binding or constipating.

Milk puddings, then, go well with stewed fruit, which is a laxative. Many thoughtful physicians agree with me in the above matter. Now I am approaching what some may hold very disputable ground, yet nevertheless I venture to say here what I am beginning to think. Both for the classical diabetic and the glycosuric, cane sugar—the sugar of commerce—is bad, producing the unpleasant symptoms of sugar in the blood very readily. Yet many glycosuric individuals can take farinaceous matter with comparative immunity from discomfort. Starch in its way to grape-sugar is much less troublesome than is cane-sugar passing into grape-sugar, why I do not know, but the fact remains. Now, with many glycosuric individuals fruit stewed in the manner advocated here is quite permissible, while ordinary stewed fruit is very objectionable. For the dyspeptic, the gouty, the bilious, and the glycosuric individual (as well as the truly rheumatic, a small class). fruit stewed with an alkali in the proportion of as much bicarbonate of soda as will lie upon a shilling to the pound of fruit, when put in the oven, will be found both palatable and permissible. It saves the gastric acidity from the acetous fermentation of the sugar in the dyspeptic, or with the glycosuric relieves him from the excess of cane-sugar which disagrees with him. Where there is distinct gout not only is fruit stewed with an alkali good and unobjectionable; but if it be prepared with the bicarbonate of potash, it is converted into a therapeutic agent of no mean value; while the resultant product is quite sweet enough for a palate which has outlived the "sweet-tooth" period. The whole matter is a simple one, yet it seems to contain much promise for many persons.—*Lancet, July* 7, 1883, *p*. 7.

15.—ON THE TREATMENT OF INFANTILE DIARRHŒA.

By Alexander Harkin, M.D., F.R.C.S., ex-President of the Ulster Medical Society, &c.

Among the ideas generally received by mothers and nurses, and unfortunately fostered by the approval or tacit permission of many members of the profession, is the indispensable necessity of the free administration of milk to the child in diarrhœa. This conviction is so strong as to blind otherwise intelligent people to the immediate laxative results of each dose. They argue, when they reason at all, that whereas the use of milk in health tends to costiveness, therefore in disease it must have a similar tendency, and it is most difficult to prevail with them to make the change; and yet in those cases in which a cure was effected under my care it was almost only when complete ablactation was resorted to, in the case of both nursling and weanling; and where milk was promiscuously ordered by my medical brethren, with otherwise scientific treatment, I have known too many cases ending fatally.

In every case, then, I enjoin total abstinence from milk—the mother's, or the milk of the cow, as the case may be, and order, as a substitute, arrowroot prepared with water, some sugar and port wine being added; and it is wonderful how much wine given in this way an infant of a few months will consume and require; beef-tea, carefully prepared and freed from fat; and, when available, condensed milk, its use being unobjectionable from its being freed from casein, the irritating element in milk. An equally important requirement is absolute rest in the recumbent position, with sufficient warmth to the extremities and surface of the body, counter-irritation over the abdomen by poultices, a sinapism if required, and, failing other remedies, a small blister over the liver, as we have, in almost every instance, congestion of the hepatic system and functional derangement, and tenderness on pressure—this form of counter-irritation will be found most salutary and rapid in giving relief. As medicine I have long since dispensed with the old chalk mixture and astringent tinctures, having found them in practice too often acting as irritants to the sensitive mucous membrane of the bowels. My chief reliance is placed upon dilute sulphuric acid, either with or without the addition of laudanum in regulated doses. It is desirable to give it singly in most cases, as it may then be ordered after even loose motions with safety, whereas when combined with opium it can only be administered after express intervals. This remedy cannot be used, however, with the necessary freedom while the ordinary practice of milk-feeding prevails, as it is almost certain to induce colicky pains by the separation of the curd in an indigestible form, and thus increase the sufferings of the infant.

The indiscriminate administration of milk in diarrhœa produces a result almost analogous. Under ordinary circumstances, when a child imbibes a quantity of milk an immediate change takes place in the stomach—the separation and rapid absorption of the soluble particles, water, oil, and sugar, and the formation of the curd, which is again dissolved by the action of the gastric juice. But in this case the digestive powers of the stomach are much diminished, and portions of the curd pass unchanged into the intestinal canal, ordinarily producing irritation, griping, and purging, and becoming still more acrid when coming in contact with the acid intestinal secretions always present in diarrhœa. In the chronic mucous diarrhœa and in the diarrhœa of measles I have found great benefit from the administration of chlorate of potassium both by the mouth and by enema.

The treatment of choleraic diarrhœa, as it acknowledges a different pathology, is naturally distinct, being of the same class as cholera infantum, English cholera, and epidemic cholera, which, according to all reliable authorities, differ but in degree, while similar in nature. They are diseases which affect the whole system, and our best guides in treatment are those who have been most successful in the country where it has its constant habitat.

Dr. Hall, who has seen a large amount of cholera in India, proposed to the Royal Medical and Chirurgical Society in

London, on October 13, 1874, a plan of treatment which received the approval of the Society, as well as that of Sir Joseph Fayrer, an experienced Indian medical officer. He recommends dilute sulphuric acid, plenty of cold water in the early stage of cholera, and if they fail to arrest the disease, and the patient get into collapse, then the hypodermic injection of hydrate of chloral diluted with ten parts of water, ten grains at a dose. This, he states, has succeeded in the majority of cases. His statement is confirmed by a large number of Indian medical officers, and his theory is as follows:—

The symptoms of collapse he explains by the result of the experiments of Claude Bernard, who taught that they were due to great irritation and hypertrophy of the sympathetic nervous system. Kolman, too, has demonstrated that the right pneumogastric nerve supplies the whole of the small intestines. This is an inhibitory nerve; and Moreau and Lauder Brunton have shown that the division of all the nerves going to a portion of intestine is followed by the secretion of a fluid just like the rice-water stools of cholera. May not, he continues, the stimulation of the inhibitory vagus be followed by results much the same as if the sympathetic supplying the small intestines were paralysed? At any rate the result is thus given by Mr. Higginson:—Chloral hydrate, being a powerful sedative, soothes the irritated nerves, and so relaxes the contracted vessels; the blood is once more uniformly distributed, the pulse reappears at the wrist, the cramps and burning abdominal pains subside, sleep is induced, respiration becomes regular, discharges lessen, the face fills up, the voice becomes stronger, and the natural secretions are restored. While this plan commends itself to our adoption, I cannot recommend it from personal experience, but I may state that I have repeatedly tested the effect of remedies to the region of the vagus in the neck in cases of dangerous and profuse vomiting in gastritis and bilious attacks, with the most satisfactory results, in the absence of any medication of an ordinary nature.—*Dublin Journal of Medical Science, April* 1883, *p.* 310.

16.—ON CONDENSED MILK AS FOOD FOR INFANTS.

By F. Dawtrey Drewitt, M.A., M.D., Assistant Physician to the Victoria Hospital for Children, and to the West London Hospital, &c.

A true Englishman's natural dislike of everything which has even the appearance of being unnecessarily artificial has caused a good deal of prejudice against condensed milk, and just now there seems to be such a marked exacerbation of that prejudice that a very valuable modern discovery is in danger of falling into disrepute. Everyone who has had anything to do with the crowds of sickly, ill-fed children with which London abounds must be aware that not only during the prevalence of that most fatal illness, summer diarrhœa, but through every month in the year, a large amount of infantile life is continually being saved by its use, and it would be a matter for regret if condensed milk should be condemned by those who have not yet attempted to give it a fair trial. The commonest objection to it is that it is too sweet. Of course it is very sweet; and in spite of our instinctive liking for sweet things, whether ripe fruit or raisins, chocolate or sugar-plums, an instinct which is so marked in childhood, few persons would think of giving a baby condensed milk when the mother had milk enough of her own, and was able to suckle the child. But, on the other hand, cow's milk is not sweet enough, and when compared with human milk very indigestible. It can only be made at all a possible food for babies by adding to it sugar and water and so making it more like condensed milk, but even then it is not so digestible as condensed milk; and it is not difficult to see the reason. Place some cow's milk with its added sugar and water in a wineglass, mix in another glass some condensed milk with water till it has, as far as one can judge by eye, about the same consistence and opacity; stand the two glasses side by side, and add to each, as the stomach does, a few drops of dilute nitro-hydrochloric acid and watch the result. They both curdle, but the curd formed in the wineglass of condensed milk is distinctly more friable, more mixed with the watery part than the curd in the cow's milk, and after standing for some time this is still more evident, for the curd in the fresh milk separates completely from the fluid into a firm clot, while in the condensed milk it remains more granular, more broken up, and more mixed with the fluid. And, except among the very poor, who cannot afford to buy cow's milk, it is this hard clot of cow's milk which is more than anything else the *fons et origo* of that only too well known incessant cry of dyspeptic hand-fed babies, and of all the vomiting and diarrhœa which so often carry them off—that hard indigestible clot, of which there is so little in human milk, and of which the analytical reports say with precise truth, as they might of a dinner of cheese, that it is so "nutritious," so full of "nitrogenous matter." And it is actually because of the small proportion of clot or casein which condensed milk contains that the second objection to it is made by the analysts. This clot or casein, which is so much the bane of hand-fed infants that the addition of oatmeal water or gruel to cow's milk, even before the child is able to digest any starchy food at all, often makes the milk more digestible, for the simple reason that the suspended particles in the oatmeal-water are interspersed through the coagulum which is formed when the milk enters the stomach, and so help to make it soft and friable, just as water-weeds frozen into ice make the ice brittle and dangerous to skate on.

Condensed milk, of course, varies in quality, and it is important not to use any of the common cheap kinds. Of those which are generally seen in the shop windows, the out-patient mothers at our children's hospitals generally prefer the original Anglo-Swiss milk, the "one with the milkmaid on the tin," as they call it, and it seems to me as good as any. And lately some unsweetened Swiss milk has been prepared, which has the appearance of being good, and certainly deserves a trial.

Then as to condensed milk causing rickets, I can only say that I have found it very difficult to trace rickets to condensed milk properly given. Most hand-fed children are delicate, a very large proportion die, and a still larger proportion have some tendency to rickets. Oatmeal and other gruels seem to be directly concerned in bringing it about; but though I have seen very many children who have had to change their diet to condensed milk, I have seen none who have become rickety. One case I do remember among the out-patients at the Victoria Hospital for Children of a child a year old who had advanced rickets. It had been fed on condensed milk, the mother said, from birth, and yet it had never thriven. She had done her best for the child; the milk was of the best brand, and she never spared it. She spread it thick on slices of bread, and gave it to the child whenever it cried, "And yet," the poor woman said, "the child doesn't get on." That condensed milk given in that form to babies, even without the bread, may cause rickets I do not attempt to deny. It appears to me to be rather to the credit of condensed milk that the baby survived.

Everything depends upon how condensed milk is given. It ought to be diluted with ten or twelve times its bulk of water, or with more than that if the child is thirsty; and if any tendency to sickness remains, about one-sixth of the water ought to be lime-water, which still further neutralises the action of the acid of the stomach and delays the formation of the clot. The water should be boiling when added to the milk, especially in the summer. It gets rid of the infusoria in bad water or in a long-opened tin. Once a day a teaspoonful of Mellin's food may be given with the milk. It is one of the best of the semi-digested foods, and children like it. With such a diet infants who at once vomit cow's milk, who keep their knees drawn up in pain, who are wasted and wretched looking, or in danger of dying from diarrhœa, become contented and happy, rapidly gain flesh, and are able after a time to begin a little weak cow's milk and water or whey. And it is thus as a bridge across a bad time that I consider condensed milk to be of the greatest importance; but the bridge may extend over some months, and in the mean time the irritability of the intestinal tract subsides, and other forms of nourishment can be gradually administered.

Three or four years ago when I was a resident medical officer at the Children's Hospital in Great Ormond-street, where good cow's milk could always be procured, and where it was given with care and discretion, condensed milk formed nevertheless a valuable article of diet, and was and probably is still used in all the medical wards; but among the poor in their own homes, where the milk is often bad throughout the year, and sour for at least three months of it, condensed milk is simply an inestimable boon.—*Lancet*, *June* 23, 1883, *p.* 1085.

17.—CASE OF TAPEWORM (TÆNIA MEDIOCANELLATA) TREATED BY EXTRACT OF MALE-FERN.

By C. Yelverton Pearson, M.D., M.Ch., Senior Demonstrator and Lecturer on Anatomy, Queen's College, Cork.

A. M., a lady, aged sixty, of robust constitution, on December 10th, 1878, told me that she had been suffering from an occasional pain in the left lumbar region, which she described as a "gnawing sensation," and stated that three weeks previously she had noticed some white things about an inch long in her stools, and that they had been increasing in numbers ever since. I asked if she remembered having eaten any bad meat previously; and she said (on thinking) that she had eaten some pork which she thought disagreed with her, about two or three months before. Believing the case to be one of *tænia solium*, I asked if she could take castor oil, and, as she said she would prefer anything else, I ordered:—℞. Ext. col. co., gr. iv; pil. rhei co., pil. hyd. āā, gr. viii. M. Divide in pil. iv. Two to be taken immediately; to take no dinner, but only some milk, and as little bread as possible during the evening; and to take the following draught on waking in the morning:—℞. Ext. filicis liq., ʒ i; mist. amygdalæ, ad. ʒ ii, M. Fiat haustus. To be followed, if necessary, by two more pills. These latter were not taken, as the tape-worm was expelled nearly in one mass about two hours after the draught was taken.

On examining the stool I found that there were twenty-five feet of tænia mediocanellata, most of it in one piece, but a few short fragments. Although there was a considerable length of the narrow portion, no trace of the head could be detected; consequently I could not feel easy as to the prognosis, but hoped for the best.

About a week after this the patient complained of a return of the gnawing sensation, and said she was sure that there was a return of the worm. However, as I thought it might be only fancy (although the patient was by no means of an imaginative disposition), I gave her encouragement, in the hope that there might be no return; however, I was disappointed, as on February 12th, exactly two months after expulsion, segments reappeared. On the 19th the former treatment was repeated, and followed by a like result. Sensation of gnawing continued, and segments again appeared on the 22nd April. In a few days the treatment was again repeated, and the parasite was expelled on the 28th. In a fortnight after this, as the gnawing sensation continued in the left side, the lady asked to have something done; accordingly I ordered two pills to be taken in the morning, to be followed on the next, at 7 a.m., by a draught containing ʒ i. of extract of male fern and a similar one to be taken about 10 a.m., after a light breakfast of bread and milk. The only result that followed was tolerably free purgation; but there was no appearance of *tænia* in the stools.

In a few days after, as the gnawing sensation continued, and the patient still desired to have some further means taken to rid her of her visitor, I ordered an emulsion, containing ℥i. of turpentine. Except the motion of the bowels, this was followed by no result.

On July 21st segments again appeared, but as the patient was away from home, treatment was deferred till August 14th. On this occasion three draughts of extract of male fern were taken (each containing ʒ i.), and were followed by expulsion.

On October 28th the patient was again treated, and the worm was expelled for the fifth time. The sixth removal took place on December 30th. The seventh on March 10th; in these three instances the treatment pursued was the same as at the first. On May 20th there was return of segments in the stools. This time I ordered ʒ ii. kamala instead of the fern; twenty-four feet came away, but no head was found; expulsion was delayed some hours later than on former occasions.

July 28th. Segments again appeared, and I now determined to order larger doses of male fern than formerly; consequently, after the usual preliminary treatment—viz., pills and limited diet, I ordered two draughts, each containing ʒ iii. ext. of male fern—one to be taken on waking, and the other three hours after. Soon after the second draught had been taken the parasite was expelled (which I now show you), the only unpleasantness occasioned being a slight tendency to nausea after the second draught.

I am happy to say that since then there has been no recurrence; and it is now over two years since the last expulsion.

There is one point on which I wish specially to dwell, viz. the large doses required for cure. The dose of extract of male fern recommended in the British Pharmacopœia is from 10 to 30 minims; and not alone from my experience in this case, but in a few others also, I believe this dose to be quite inefficient; more especially in cases of tænia mediocanellata, which is generally acknowledged to be a more difficult parasite to dislodge than tænia solium. I would not feel justified in ordering, on the first occasion, such a large dose as that given previous to the final expulsion in the above case—viz., three drachms; but I think we are certainly safe in giving from one drachm to one and a-half drachms, and repeating it in a few hours if the worm be not expelled in the meantime; and then, should a recurrence take place, we may increase the size of the dose, more especially if it had been well borne in the first instance.—*Dublin Journal of Medical Science, May* 1883, *p.* 433.

18.—INTESTINAL OBSTRUCTION FROM VOLVULUS TREATED BY ABDOMINAL SECTION.

By J. Kingston Fowler, B.A., M.B., Assistant-Physician to the Middlesex Hospital; and to the Brompton Hospital for Consumption.

[On an interesting case of this kind in which the abdomen was opened and the bowel traced, but which ended fatally, Dr. Fowler makes the following remarks :]

One object which I have in view in bringing this case before the Medical Society of London, is to draw attention to some points in the treatment of certain cases of intestinal obstruction which I think of great importance. The first is the auscultation of the colon and cæcum during the administration of an enema. This should never be omitted, as it often affords valuable information as to the site of the obstruction, and so to some degree indicates the line of treatment to be followed. If during the injection the fluid can be distinctly heard gurgling in the cæcum, it may be considered almost certain that the obstruction is in the small intestine. If the flow of fluid is stopped at some intermediate point in the colon, it is very probable that the obstruction is situated at that spot, but the indication is not so certain, as a case is recorded in which fluid injected into the rectum flowed out as fast as it was poured in, and this being taken as an indication that the sigmoid flexure was the site of the obstruction, colotomy was performed in the left loin. On the patient's death from continuance of the obstruction, its site was found to be the small intestine. A possible fallacy in this test is that the movement of fluid in the bowel beyond the obstruction, owing to increased peristalsis, may be mistaken for the gurgling sound produced by the fluid injected. In the last four cases of obstruction, however, which I have met with, and have seen this test used, it has given trustworthy indications. I have lately repeated the experiments on the cadaver made by A. Hall in 1846, and by others since with the view of testing the competency of the ileo-cæcal valve, and find that on injecting water into the colon its passage into the ileum is arrested at the valve, and that the greater the tension of the fluid in the cæcum the more closely are the edges of the valve approximated. In one experiment some air passed through the orifice; this is probably due to the fact that in the cadaver the normal tonicity of the sphincter is lost. I think there can be no doubt that the ileo-cæcal valve in the living body under normal conditions does effectually prevent the passage of fluid or air from the cæcum to the ileum. I am aware that cases are recorded tending to prove that as the result of an anti-peristaltic action fluid and solid materials injected or placed in the rectum have passed the ileo-cæcal valve; but even if this be so, it does not follow that any mechanical effect can be produced on the interior of the small intestine by rectal injections. If therefore the obstruction appears to be in the small intestine, it is useless to persevere with enemata, the only effect they might possibly produce being an increased peristalsis in the lower portion of the ileum, and all authorities agree that one object of treatment in intestinal obstruction is to diminish as much as possible the excessive peristalsis. If, however, the obstruction appear to be in the colon, there is a fair chance that it may give way before the continued use of warm enemata, or inflation of the bowel with air. Under almost all circumstances it is advisable to get the patient partially under the influence of morphia without delay, thereby checking the vomiting and peristalsis, relieving the pain, and warding off the onset of collapse.

There is some danger that the comparative calm thus induced may tempt us to postpone those operative measures by which alone in many cases the patient can be permanently relieved. This remark applies especially to cases of acute internal strangulation of the small intestine, which are extremely fatal. I have a strong conviction that this mortality might be diminished if resort were had to the operation of abdominal section before the patient's strength has been exhausted by constant vomiting. On looking back at this case, one's only regret is that the operation was not performed earlier; had it been, it is quite possible that a life might have been saved. In this, as in so many similar cases seen in hospital practice, valuable time had been lost before the patient's admission, the result being that although the operation was completely successful in relieving the obstruction, and was not followed by peritonitis, the patient sank from exhaustion. Speaking generally, the results of this operation cannot be said so far to have been very encouraging, but still a fair number of successful cases are on record, and the number is steadily increasing. The danger of the operation in my opinion arises chiefly from the manipulation of the distended intestines; this in the most careful hands is very liable to produce partial or complete rupture, an accident which in my own limited experience has happened three times to distinguished surgeons.

So far as I have observed the operation is usually performed in the following way:—The peritoneal cavity having been opened by an incision of the required length in the linea alba. between the umbilicus and the pubes, the fore-finger is passed in and careful search made for the cause of the obstruction. If this cannot be found, the operator proceeds to examine the whole length of the bowel, beginning with the portion of small intestine presenting at the incision; with one hand he withdraws a further portion and with the other returns the part already examined. Unfortunately there is no means of telling whether the bowel is being examined in the direction of the duodenum or of the cæcum. At one operation which I witnessed, after about fifteen feet of intestine had been examined, the duodenum was reached, when it became necessary to reverse and repeat the whole process. This done, it was evident that had the bowel been examined in the opposite direction the obstruction would have been reached almost immediately, an unfortunate but, under the usual mode of operation, unavoidable occurrence which prolonged the operation by nearly half an hour. It is obvious that such an amount of exposure and handling of the intestines as this method involves must greatly increase the risk of peritonitis and rupture. And beside the danger from peritonitis, rupture of the bowel, and shock of a prolonged operation thus entailed, there is, I believe, another risk, less serious, but still to be avoided if possible. It is this. Let us suppose the examination of the intestine to have been commenced at some point between the obstruction situated in the small intestine and the duodenum, and continued in the direction of the latter. As the successive portions of bowel are withdrawn, the contents are gradually carried onward to the pylorus, and regurgitate into the stomach, where their presence must add to the already existing depression, and diminish the chances of recovery. In the case to which I have just alluded, where death occurred soon after the operation, and without any recurrence of vomiting, the stomach was found to contain more than two pints of fluid, which had evidently regurgitated from the intestine, possibly in the manner I have just described. In the performance of the operation of laparotomy, it should, I think, be laid down as an absolute rule that the distended bowel is only to be manipulated in case the surgeon after a most careful search is unable to find any contracted bowel; and I am not quite sure whether in such a case the patient's chance of recovery would not be almost as good if the operation were abandoned, and full doses of morphia administered.

There are many advantages in dealing with the collapsed bowel only; one is that it can be examined with much greater ease and in far less time than it takes to overlook an equal length of distended intestine; another is that if a considerable length be exposed at one time, there is no difficulty in returning it into the abdomen. There is no more painful sight than that of a surgeon struggling with a mass of intestines which, in spite of all care, have slipped out of the abdomen and refuse to return; as fast as one portion is replaced another escapes, and in the end he may be considered fortunate if the bowel does not rupture, or if he is not compelled to puncture to allow the gas to escape; a proceeding which, although considered by some to be entirely without danger, had much better be avoided, if possible. Another advantage of this method is that the collapsed intestine never leads to the duodenum; and, most important of all, there is much less risk of peritonitis resulting from exposure and handling of the collapsed bowel.

If, then, there be advantages in dealing with the collapsed bowel only, it becomes of great importance to know where it is likely to be found. The distended abdomen is tympanitic, and when it is opened distended bowel is always seen on the surface. This is only what might be expected: the air-containing portion naturally rises to the surface.

In making post-mortem examinations I have been struck with the fact that if the upper portion of the small intestine be distended, the lower and collapsed part of the ileum is nearly always seen lying in the pelvis. I believe that the same condition obtains in strangulation of the small intestine, and *that the collapsed portion of the bowel, which it is of so much importance to secure, will in these cases be found in the pelvis, and may be most easily reached towards the right side.* I ventured to suggest to Mr. Hulke before he commenced the operation that he would probably find the collapsed bowel in the pelvis, and on passing his finger deeply down he at once brought out a portion of the lower contracted end of the ileum. I have not been able to find any record that attention has already been drawn to the point. The explanation I believe is that during the violent and continued peristalsis and gradual distension of the bowel above the obstruction, the smaller and less active portion of bowel below, after expelling its contents, is forced downwards into the pelvis, whilst the distended, and therefore specifically lighter, portions rise to the surface. The pelvis also is too small to hold a distended loop. Another point to which I should like to call attention is that in cases of internal strangulation from bands care should be taken to make sure that the band divided is the cause of the obstruction, and that there is not another present in the immediate neighbourhood, which, if not assisting in the present, is at any rate a possible source of future trouble. I have lately met with two cases where at the autopsy a second band was found close to the divided one. I do not, however, think that the possible existence of a second band is of sufficient importance to justify any handling of the distended bowel when the immediate cause of the obstruction has been ascertained. It is not possible within the limits of this paper to discuss thoroughly the diagnosis and treatment of the different conditions which may give rise to intestinal obstruction. The various rules for distinguishing between obstruction of the large and small intestine are well known, but a very limited clinical experience is sufficient to teach one that cases are met with which transgress all rules and almost defy diagnosis, both regional and pathological. I have contented myself with drawing attention to a few points which appear to be important.—*Lancet, June* 30, 1883, *p.* 1119.

DISEASES OF THE URINARY ORGANS.

19.—URIC ACID AND ITS RELATION TO RENAL CALCULI AND GRAVEL.—INFLUENCE OF REMEDIES.

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[In our last volume (pp. 54, 215) we gave Dr. Garrod's observations on the effects of saccharine food, and of different alcoholic beverages on the uric acid secreting function. The following is a continuation of his Lumleian Lectures on this subject.]

Before proceeding to the more purely therapeutic part of our subject, I must devote a few minutes to the discussion of other classes of food in reference to the same function; and, first, with respect to the influence of a nitrogenised, and especially of an animal diet. Observations are not wanting to show the effects of a pure meat diet on the urine. Those of Lehmann are, perhaps, the most satisfactory; they are so valuable that I must now call your attention to the results:

He first determined the daily excretion of the principal constituents of his urine when on an ordinary mixed diet; he then placed himself on a purely animal diet (chiefly eggs) for twelve days; afterwards, for another twelve days on a purely vegetable diet; and subsequently, for two days on a purely non-nitrogenised diet, which consisted of fat, milk, sugar, and starch. You will see the results in the table, in which I have left the original numbers obtained by Lehmann, in grammes, as the smaller numbers are easier of comparison with each other than would be the case if the results were reduced to grains.

Table exhibiting the Mean Results of Lehmann's Observations on the Effect of Different Diets on the Excretion of the Urinary Constituents. Expressed in Grammes.

	Total solids.	Urea.	Uric acid.	Salts and extractives
On a mixed diet	67·82	32·498	1·183	12·746
On an animal diet	87·44	53·198	1·478	7·312
On a vegetable diet	59·24	22·481	1·021	19·168
On a non-nitrogenised diet	41·68	15·408	0·735	17·130

The conclusions which particularly interest us at present are that the total solids, as well as the urea, are much increased by animal food, while they are considerably decreased by a vegetable diet, and still more so by one which is non-nitrogenised; whereas the uric acid is not nearly so much affected by the nature of the food, provided that it contains nitrogen. Thus, it is seen that the urea, on an animal diet, was to the uric acid 53·198 : 1·478; on a vegetable diet, 22.481 : 1·021; and on a mixed diet, 32·498 : 1·183. Estimating the amount of uric acid, on a mixed diet, as 1, animal food brought it up to 1·27; a vegetable diet lowered it to 0·863; and a non-nitrogenised diet to 0·63.

Lehmann found that after the use of purely animal food the urine of man closely resembles that of the carnivorous mammals, becoming of a light amber colour; having a strong acid reaction, and containing neither lactic nor hippuric acid.

On the other hand, after a course of vegetable food, the urine becomes of a brownish-red tint, is much less acid, often deposits the earthy phosphates, and always contains alkaline lactates with oxalate of calcium—in fact, the urine closely approaches to that of the herbivorous mammals. It might be added, though Lehmann does not allude to the fact, that, under these circumstances, there is also found hippuric acid in considerable quantities.

As a result of all the experiments made by different observers—both on man and the lower animals—I think we may fairly come to the conclusion that meat, taken in such quantities only as are sufficient to keep up the nutrition of the body, has no tendency to increase the excretion of uric acid; that, when the diet is purely animal, but the quantity small (as is the case with the carnivorous animals when in confinement), the uric acid, far from being large, becomes exceedingly small in amount, more especially when it is compared with the urea. On the other hand, that the taking of a great quantity of meat—an excess compared with the requirements of the system—tends to increase the uric acid, though, even then, not more than in proportion to the urea. Funke states that uric acid is less affected by food than any other ingredient of the urine; it is, however, influenced by the time of taking it: that is, uric acid is thrown out in larger quantities after a meal than during the hours that an individual is fasting.

These different facts can be advantageously applied in practice in the treatment of gravel and calculus. In such cases there is certainly no reason why a proper quantity of animal food should not be taken; and the knowledge of this is important, seeing that many patients have been lowered in health by being kept on insufficient diet, with the idea that, by these means, a lessening of the excretion of uric acid would result.

Fatty and Oleaginous Food.—With regard to the influence of such food on the urinary excretion, the experiments of Dr. Böcker seem to be most trustworthy; and from them it would appear that no influence whatever is exerted on the excretion of water, urea, uric acid, or any other constituent of the urine, by taking from about a quarter of an ounce to three ounces of butter daily.

Causes of Gravel and Calculi.—In the course of our experience, most of us have noticed that there are certain individuals who are prone, either to pass an urine thick from urates or containing uric gravel, or to void numerous small calculi; others, again, have no such tendency, and only on rare occasions observe any thickness in their urine. Can we link this condition with any other constitutional peculiarity? I think we can; and that we shall find, on inquiry into the history of those liable to pass gravel and calculi, that they frequently inherit gout. In looking over 1900 cases of this disease, which I have had extracted from my books, I find it mentioned that, of this number, comparatively few had passed calculi. If, on the other hand, we examine cases of calculus, we shall find that a much greater percentage of these patients are the children or grandchildren of gouty parents.

In the course of my experience, it has frequently occurred to me to see a man suffering from gout, and to find that he has one child who has had attacks of joint-gout; another who is suffering from eczema; and a third who is passing uric gravel or calculi. It is not very uncommon to find articular gout and calculus present in the same person. Sydenham, in his own person, was a good example of this combination; in fact, we may fairly conclude that those who suffer from an abnormal condition of the uric acid function on the inner side of our imaginary partition, mentioned in the first lecture—that is, in the blood or system at large—are also more prone than others to experience the effects of a morbid state of the same function on the outer side, or in the urinary tract: in other words, gouty subjects, or those who inherit that diathesis, are more liable than others to gravel and calculus.

There are, however, many influences which act strongly in determining the morbid action to the urinary tract—influences which will often cause the occurrence of such troubles in those who do not inherit them. We see, for example, that, in England, stone is more common in some counties than in others, and at one time of life more than at another. How can we account for this?

Anything that checks the cutaneous function, such as the cold east winds of spring, felt so acutely in Suffolk and Norfolk, appears to act as an exciting cause, and it is well known that in these counties gravel and calculus are very common. When the action of the skin is checked, there is no increase of urates, but an undue acidity of the urine, which leads to the precipitation of the uric acid. Cold alone is not necessarily a cause, for in Sweden and Norway calculous diseases are very rare. Another cause which, I believe, leads both to an increase of the excreted uric acid and to its deposition in the urinary organs, is portal congestion. Of the exact pathology of this we are at present ignorant, but, in the prophylactic treatment of gravel and calculus, it is important to look to this point; and much good is produced by the frequent use of remedies which tend to relieve such a condition. Hence the value of Carlsbad waters and salts, and of the numerous saline purgative waters which, of late years, have been so much employed. It must always be borne in mind that, in this administration in the diluted form, the water itself becomes an important element in their action upon the system.

Effects of Alkaline Treatment.—[Dr. Garrod's remarks on the effects of alkaline treatment will be found in our last volume at page 222. Having himself introduced *lithia salts* to the profession as internal remedies and used them continuously for 25 years, he felt it his duty to bring forward evidence in support of their therapeutic value, and to ascertain the truth or error of the statement which had been put forward as to their comparative inutility. For this purpose he had a series of experiments made, and the results tabulated. He says:]

The results of these experiments are very striking. Let us first consider the soda numbers; we find that the percentage of solvent power in three experiments was 21·2, 18·1, and 15·3, the average being 18·2 per cent. The percentage of the potash numbers was 28·6, 27·6, and 35·3, the average being 30·5 per cent. The corresponding lithia numbers were 43·8, 58·6, and 47·7, the average being 50·0 per cent. In all three cases the difference between the mean and the extremes is not very large; and such differences must always exist when we use an impure substance, such as the fragments of a calculus, which is never composed of a pure chemical salt. We see, then, that in solutions of the strength mentioned, the value of the lithia-salt over that of potash, and still more over that of soda, is most evident. Other experiments were afterwards made with solutions of different strengths. Thus, in three experiments, the solutions contained fifty grains to the twenty fluid ounces; time, twelve hours; temperature, 100° Fahr.; with frequent agitation.

The carbonate of sodium solution dissolved 16·2 per cent.
The carbonate of potassium ,, ,, 23·1 ,,
The carbonate of lithium ,, ,, 37·7 ,,

In another experiment, the sixty-grain lithia solution being used, but the time altered, at first to ten hours at 100° Fahr., then to eight hours at about 60° Fahr., the solvent power was 60·8 per cent.; but, when a solution containing one hundred grains to the twenty fluid ounces was employed, the solvent power was as high as 70·2 per cent.

Lastly, it will be observed that when the comparison of the solvent power was made between the potash and lithia salts, using twenty and afterwards ten grains to the pint—the quantity used by Dr. Roberts in his lithia experiments—the results were in each case more than 50 per cent. in favour of the carbonate of lithium.

It will be seen from these experiments that so far as soda and potash are concerned the results obtained exactly agree with those of Dr. Roberts; they exemplify the greater solvent power of the latter over the former—a result which might have been clearly anticipated,—but, on the other hand, they are totally opposed to his conclusions with respect to lithia. How is this to be explained? On looking at the solubility of urate of lithium, as seen in Table 1, we find it more than twice that of the potash salt, or as 220 to 500, and we can scarcely believe that in solutions of the two carbonates the uric acid would be found to be most soluble in the one which contained the alkali which gave the more insoluble urate; this would be absurd—in fact, we should anticipate that the lithia solution would prove as superior to the potash as we have already found the potash to be to the soda solution.

We must look for some means of explanation. Dr. Roberts used the expression "only weak solutions of carbonate of lithia *could* be employed," italicising the word "could"; and he appears to have used in his four experiments, two of which are given in the Medico-Chirurgical Transactions, solutions of the strength of ten and twenty grains to the twenty ounces, whereas in the case of the potash he found that a sixty-grain solution is the most powerful. Now, it will be seen in the table that solutions of carbonate of lithium were employed containing sixty and even as much as one hundred grains to the imperial pint, and that, in the case of lithia, as the strength was increased the solvent power also was augmented. I should imagine that Dr. Roberts either used an impure carbonate of lithium or assumed that only one grain was soluble in the fluid ounce, as he used only ten and twenty grain solutions; whereas as much as one hundred grains can be dissolved, at the temperature of the body, in the imperial pint of water. Impurity of the salt and the use of solutions which were far too weak will at once explain the discrepancies and the cause of the erroneous statements with regard to the solvent power of the lithia salts. No one who has thoroughly investigated the action of these salts, in comparison with those of soda and potash, as internal remedies can come to any other conclusion than this, viz., that lithia salts are far more powerful solvents of uric acid than potash salts, while these latter are more efficacious than those of soda.

We have only to take three small phials, filled with a solution of the three carbonates of the same strength, and to put into each the same quantity of small uric calculi, the amount being such that the lithia will dissolve them. If we carry these in a warm pocket, after a short time it will be seen that all the calculi have disappeared from the lithia solution, while more than half are left undissolved by the potash, and about four-fifths by the soda solution.

I have been informed by some patients that they have been deterred from using lithia-salts, although they have found them valuable, by having been told that their employment would prove injurious, owing to their caustic effects upon the renal organs. In answer to this objection, I may say that I have found the action of carbonate of lithium to possess less destructive power than the corresponding salts of potash and soda upon nimal tissues.

The only effect that I have ever noticed has been that, when he quantity is increased beyond a certain amount, a little remor of the hands is produced, which passes off at once on the liminution or omission of the dose of the salt. I have known atients, of their own accord, continue the use of lithia-salts or more than ten years, with the effect of entirely preventing he recurrence of the symptoms to remove which they were first rescribed, and without the production of any injurious effect.

For myself, I have not the least doubt as to the value of lithia-salts as therapeutic agents, and am convinced that by their employment depositions of uric acid in the renal organs can to a large extent be prevented. Free dilution and administration on a fasting stomach are points of much importance, which should be attended to in the administration of alkaline remedies. I have been much in the habit of using potash with lithia, in the form of the citrate or the carbonate; the former to give neutralising, the latter to increase the solvent power.

Influence of Hippuric and Benzoic Acids.—At first sight it would appear to follow from various facts, that the seat of origin of uric acid is further back than the kidneys, and that these organs merely eliminate it from the circulating fluid; in other words, that what we have called the first view is the correct one; but I have already shown, that the kidneys will not act as filterers of uric acid, even when that principle is known to exist in the blood.

Some little time ago, in thinking over the subject of gravel and calculus, I arrived at the idea that, if the urine of man could be maintained in a condition resembling that of the herbivorous mammal, there would be no such things as uric concretions, uric gravel and calculus would be unknown.

Alkaline remedies, useful though they are, do not effect all that could be desired. They do, indeed, as we have seen, hold the uric acid in solution, but in no degree do they remove it, for analysis has shown that the amount eliminated under the influence of alkalies is not at all decreased. While following up my idea of assimilating the urine of man to that of the herbivorous mammal, I made several experiments, to which I will now allude.

I took a specimen of healthy human urine, of full specific gravity, and sufficiently rich in urates to give a free deposit of uric acid crystals when acidulated. With this I filled two tubes to about one-fourth of their capacity. To the first of these I added the urine of a horse, so as almost to fill the tube; to the second I added the same quantity of distilled water, in order that the amount of dilution of the human urine should be the same in each tube. After the tubes had been kept for some two or three hours at about 100° Fahr., their contents were examined. A few drops of hydrochloric acid added to the second tube—where water had been used as the diluent—caused a slow crystallisation of uric acid, but the acidification of the first, in which the urine had been diluted with that of the horse, failed to exhibit any precipitation; nor, when it was evaporated to a small bulk, could uric acid be detected either by the murexide or any other test. The experiment was repeated with the substitution of the urine of the lion for that of the horse. This failed to cause the disappearance of the uric acid.

If these observations are correct, we have arrived at a remarkable conclusion, for we have found not only that the horse's urine is itself free from uric acid, but that it possesses the power of destroying, at least to some extent, the uric acid contained in the urine of man. It struck me that this conclusion was one which might be fraught with weighty consequences, and deserved, or rather demanded, much further and stricter investigation to corroborate it. Such proof, you will find, is not wanting.

I next took eight very small uric acid calculi, none of them larger than a pin's head, and, by the aid of a solution of carbonate of lithium, dissolved them in a little water. To this solution I added about eight ounces of the urine of the horse. After the mixed fluids had been kept some few hours at the temperature of the body, no uric acid could be detected.

This experiment shows that uric acid, in the form of calculi, when first dissolved in an alkaline solution, is destroyed by the influence of some ingredient which is present in the urine of the horse. After reflecting upon these phenomena, I endeavoured to find out what was the principle contained in these urines of the herbivora which imparted to them this peculiar power; and, seeing that they are rich in hippuric acid—a substance absent from the urine of the carnivora—I instituted a very numerous set of experiments upon the action of this acid on uric acid.

First, a strong solution of hippurate of potassium was mixed in equal quantities with a cold solution of the urate of the same metal, and kept for some few hours at the temperature of the body. On subsequent examination for uric acid by the microscopic test, none could be found, nor could any be detected by the murexide test. Another recorded observation is as follows. A cold concentrated solution of urate of ammonia was mixed with a strong solution of hippurate of sodium, made slightly alkaline with the carbonate; after being kept for a few hours at 100° Fahr., no uric acid could be found.

As it might be urged that the uric acid, though existing, was masked by the presence of other matters, the following observations were made, and have been frequently repeated. A cold solution of urate of ammonium was added to one of hippurate of sodium, and the solution made slightly alkaline with the carbonate, so as to imitate as nearly as possible the conditions which exist in the urine of the herbivora. On immediately placing a drop on a microscopic slide, and acidulating it with hydrochloric acid, numerous long crystals of hippuric acid were soon formed, and afterwards rhombic crystals of uric acid were seen, these latter being readily distinguished by their characteristic shape, and by their intense polarising power for light. After about half an hour, the solution having being previously warmed up to the temperature of the body, a second drop was examined, and the uric acid crystals were found to be much less numerous, and in another hour or so they were not to be detected at all. The solution was afterwards evaporated, and no evidence of uric acid could be discovered either by the microscope or the murexide test. By this observation, the fact that a change slowly takes place in the solution of the mixed salts is demonstrated; and it is also proved that the uric acid is not simply masked by the presence of other salts, for it is readily exhibited when the solutions are first mixed, and only slowly disappears under the influence of time and warmth.

In the earlier experiments which I made, which were qualitative only, it was found essential that the hippuric acid should be in large excess, in order that the results should be conclusive; but I was soon led to make quantitative experiments, so numerous that their enumeration would be tedious. I shall, therefore, only give you the results obtained, and leave the details to be studied elsewhere, if desired.

In these observations I have used the urates of ammonium, sodium, potassium, and lithium, and acted upon them with the hippurates of the same bases, and I have uniformly found that when hippurates and urates are together in solution a change ensues, the urate becoming gradually destroyed, and probably a part of the hippurate also. It has required, under the conditions which have been present in most of the experiments, nearly fifty times as much hippurate as urate for the complete destruction of the urate; but, when the dilution was much increased, the quantity of hippurate required seemed to be lessened, as little as twenty-five parts of hippurate being sufficient. Possibly in the animal body the action takes place more rapidly than in the flasks of the laboratory.

Although my experiments have been numerous, and have occupied a very long time, still I feel that more are required in order that we may arrive at definite conclusions as to the relative power of the different hippurates and urates over each other, and the quantity of dilution which gives rise to the maximum amount of action; besides which, the nature of the change which ensues requires to be thoroughly investigated. The details of my experiments on the subject are contained in the appendix to a paper recently read to the Royal Society.

Having established the fact that hippuric acid reacts upon uric acid, we can, I think, at once make use of it to explain a difficulty which we left unsolved in our first lecture in relation to the urine of the sucking-calf. We have only to take our original assumption that there are cells in the kidneys of all herbivorous mammals capable of forming uric acid—then, this principle would be always present in the urine unless it was subsequently removed; and having now shown that hippuric acid has a destructive power over uric acid, it follows that, when the urine of a herbivorous mammal contains but little hippuric acid, then uric acid is present. This is the case in the sucking-calf. When, however, the young animal ceases to take milk, and lives on a diet of grass, clover, and the like, then the urine becomes rich in hippuric acid, and the uric acid disappears, being removed by the destructive influence of the hippuric acid.

The explanation I consider to be satisfactory, though it is one which I could not, till recently, have imagined to be correct. It is generally supposed that hippuric acid replaces uric acid, that is, is formed in its stead in the system. It does indeed replace it, though not, as is usually thought, by being formed, under certain circumstances, instead of it, but on account of its possessing the power of removing the uric acid after it has been produced in the renal cells. The explanation holds good equally with reference to the occasional presence of uric acid in the urine of the adult herbivorous mammal. Under their ordinary diet a certain amount of uric acid is always formed. Hippuric acid is also present in large quantities, sometimes as much as 1—1·5 per cent., in which case no uric acid can be discovered in the urine; but, when these animals are made to eat food which fails to yield hippuric acid, the uric acid remains intact, and hence it is that, from time to time, we hear of the presence of this principle in the urine of herbivorous mammals.

Now it follows necessarily that what happens in the case of these lower animals, applies also to man. If the quantity of hippuric acid becomes increased, the uric acid becomes diminished, and we are in a position to explain an observation made by Heller, who, in conjunction with a friend, first ascertained the quantity of uric acid which each excreted daily when under an ordinary diet; they then changed the character of their food—Heller living for a week on wheaten and rye bread, his friend on rye bread only, water being the sole drink of both. The uric acid soon began to diminish and to be replaced by hippuric acid, and at the end of the week a mere trace of uric acid was found in Heller's urine—none in that of his friend. During the next week, on an ordinary diet, the hippuric acid gradually diminished and the uric acid reappeared in the former quantities. Doubtless the character of the food, in these experiments, had a direct influence on the formation as well as on the destruction of the uric acid, for the amount of the nitrogenised elements of the food must have been small.

We know that glycine or glycocol (gelatine sugar), which enters into the composition of the bile of many animals, is closely connected with hippuric acid, that this latter can be broken up into benzoic acid and glycine when boiled with caustic alkali, and, in fact, benzoic acid, when absorbed from the stomach, takes up glycine and becomes converted in the system into hippuric acid, and is thus thrown out in the urine. Such being the case, I thought it most desirable to try the influence of this body upon uric acid, and to find out whether it plays any part in the change of the uric acid. I made numerous experiments, using glycine in place of hippuric acid, the other conditions remaining the same, and in no instance did I observe any change in the uric acid—even when days or weeks had elapsed. I then had to look to benzoic acid, and ascertain whether the change in the uric acid was due to its influence, and for this purpose I completed a set of observations corresponding to those previously made with hippuric acid. The results were as follows:—

I found that benzoic acid, in the form of a benzoate, when in contact with an urate in an alkaline solution, caused the same slow change in the uric acid which ensued when a hippurate was employed. This change, however, cannot be well observed under the microscope because the crystallisation of the benzoic acid is so rapid that the presence of uric acid is obscured; but, when the solution is evaporated and the benzoic acid removed by alcohol, the murexide test can be readily employed. In the appendix to my recent communication to the Royal Society, I have detailed the various observations on this point, which appear to show that about the same amount of a benzoate as of a hippurate is required in order fully to effect the change in the uric acid.

To us, as physicians, several questions naturally suggest themselves. Can we make any practical use of the facts before us? Will the administration of hippurates or benzoates prove of any practical value in the treatment of the different forms of diseases connected with the uric acid diathesis? Can a diet be devised which will assimilate to some extent the urine of man to that of the herbivorous mammal? These are questions of no little importance to us and to humanity at large.

Let us see how far they may be answered. In January, 1842, when a young student, I read a paper before the Chemical Society, which was published in their Transactions and in the Philosophical Magazine for that year. It was entitled "On the Conversion of Benzoic Acid into Hippuric Acid in the Animal Economy." In it, I fully confirmed Wöhler's then recent discovery of the conversion of the one acid into the other, but I proved that this change could not be effected by the benzoic acid uniting with the uric acid, as has been suggested—first, because the quantity of the latter was not sufficient; secondly, because the uric acid found in the urine excreted three or four hours after the taking of benzoic acid was not very appreciably diminished.

I also suggested in the paper the probable future synthesis of hippuric acid, and that, if benzoic acid be administered beyond a certain amount, the excess will pass into the urine in an unchanged condition. Both these suggestions have since then been realised.

Within the last few years I have returned to the consideration of the subject, and have obtained a large amount of clinical experience.

If hippuric and benzoic acids in an alkaline solution possess the power of changing and removing uric acid, it is natural to suppose that, when the blood is in an abnormal state from its presence, the administration of the salts of these acids should prove valuable; for there is no doubt that if hippurate of sodium be added to a blood-serum which shows the presence of an urate, the latter is soon removed from it. Clinically, I have derived great advantage from the administration of these salts, which I have used very largely in cases of gout; and patients have asked to be allowed to continue taking them, so much did they think they were benefited by them. To us at the present time, it is important to ascertain whether they are of value in cases where uric acid is liable to be deposited in any portion of the urinary tract. This I shall endeavour to do.

In the first place, these salts act advantageously on the mucous membrane of the bladder and its appendages; and, in cases where there is a disposition in the urine to become ammoniacal from decomposition, they are most useful in checking such tendency. You will, perhaps, remember that in my first lecture I said that I had found the urine of the horse much less liable to decomposition than that of man, a circumstance possibly due, in part, to its containing hippuric acid. This action on the membrane may influence much the secretion of the colloid matter, and thus prove valuable in cases of gravel and calculus, which are so intimately associated with its urine; and lastly, it may have an effect upon the excretion of uric acid—a point which I must now endeavour to ascertain.

I have said that the usual absence of uric acid from the urine of the herbivorous mammal is due, not to its non-formation, in small quantities, in their kidneys, but to the presence of considerable quantities of hippuric acid in the urine; and that, provided that we remove this latter principle by an alteration in the food, assimilating it to that of the young sucking animal which takes milk only; or by giving vegetables which do not yield hippuric acid; that then uric acid appears in their urine. Ought we not, therefore, to conclude that the administration of benzoic or hippuric acid would influence the excretion of uric acid? Is this the case? In the herbivora, the urine is always alkaline in reaction; in man, it is acid. In my experiments on the destructive influence of hippuric or benzoic acid upon uric acid, I found it important to use solutions made alkaline with a carbonate, thus imitating, as nearly as possible, the condition of herbivorous urines. We do not get this in the case of man. Let us see the facts. In 1842, when, in a very limited number of experiments, I gave benzoic acid in the free state, I found but little alteration in the excreted uric acid, still it was lessened.

Kerner, who appears to have made a careful set of experiments, came to the conclusion that neither the nitrogenised nor the other principles of the urine were influenced by benzoic acid.

I have recently made some observations on the action of benzoic acid on the urine, with the results which I will give you in a minute. I may tell you that great care must be taken not to form conclusions from one or two experiments, as the excretion of uric acid is always fitful, little circumstances causing it to be greatly diminished for a few hours, and then suddenly increased. If the uric acid is directly formed in the renal cells, it is natural to suppose that much of it would escape the action of the hippurates contained in the fluid portion of the urine, and especially if that fluid is in an acid condition; and experiments seem to confirm this idea.

Benzoic acid, given by itself, increases the acidity of the urine, as is well shown when it is administered in cases of phosphatic urine: and, under these circumstances, it can possess little or no power of changing any urate it may meet with in the renal cells or other parts of the urinary tract. I am still engaged in clinically investigating the value of the benzoates and hippurates, both in cases of gout and of gravel and calculus; and I hope ere long to bring the further results before the profession. I can confidently affirm that I have already obtained great advantage in the treatment of these diseases from their employment.

I frequently give the benzoic acid in the form of benzoate of sodium; but, if I wish at the same time to increase the quantity of the urinary excretion, then I give the benzoate of potassium or of lithium; and, if there be an abnormal acidity of the urine, some alkaline citrate.

Seeing that herbivorous animals excrete hippuric acid in a greater or lesser quantity according to the character of the food upon which they are fed, I cannot help thinking that some article of diet might be devised for those who suffer from the diseases above mentioned, which might, at least to a great extent, keep in check the tendency to form and deposit uric acid.—*Med. Times and Gazette, June* 23 *and* 30, 1883, *pp.* 689, 719.

20.—ON THE CHEMICAL PATHOLOGY OF DIABETES.

The EDITOR OF THE BRITISH MEDICAL JOURNAL on the Discussion at the Pathological Society of London.

Every and any deviation from the natural condition of the body, whether as regards structure, nutrition, or function, constitutes disease; yet there was found a speaker to maintain that, since the observed morbid anatomy varied greatly in different cases of diabetes, therefore no such disease as diabetes existed; that it was to be regarded merely as an aberration of function. But surely aberration of function is disease. This view of pathology, however, is too narrow and short-sighted to deserve discussion. The interest of the debate was undoubtedly greater on the second night than on the first. This was due "in great measure" to Dr. Dickinson's spirited reply to the criticisms which several speakers had made on his observations and theories, but especially to the long and important speech of Dr. Pavy, who detailed the results of some of his recent researches. It is interesting to note that, as Dr. Douglas Powell, who closed the discussion, remarked, the observations and experiments of these two distinguished physicians and pathologists do, to a great extent, dovetail. Basing their knowledge on clinical observation—for the clinical physician never doubts that diabetes must be studied as a special disease—the one observer has turned to morbid anatomy, the other to experimental physiology, to afford some explanation of the phenomena of the disease; for "physiology and pathology," to quote the words of the late Dr. Parkes, "are in fact one; normal and abnormal life, regular and irregular growth and decay, must be studied together."

Every part of the body contains carbo-hydrates, chiefly in the form of starch. To import the word glycogen into the discussion appears merely to add an element of confusion; for glycogen, according to Dr. Pavy, is chemically identical with the starch found in vegetables. Further, it would appear that, in every part of the body, the formation of starch from maltose, or dextrin, is constantly going on. The liver possesses this power to a pre-eminent degree. Glucose, cane-sugar, and starch are, in health, all converted by the ferments of the alimentary canal into maltose; this is the process of digestion of the carbo-hydrates. This maltose is absorbed, and the portal blood can be shown to contain a large quantity of it; the blood, however, which leaves the liver contains no maltose, and, indeed, comparatively little more than a trace of carbo-hydrates; the relative proportion in one of Dr. Pavy's experiments which he communicated to the Society, was 5·11 in the portal blood, and ·80 in the venous blood of the right side of the heart.

The chief carbo-hydrate which the portal blood contains is maltose, and this is converted, in the liver, into the colloidal body glycogen, that is, into starch. The liver, in health, contains no maltose; it contains starch and a trace of glucose. We give the results of one of Dr. Pavy's most recent experiments: a healthy rabbit was pithed, the abdomen immediately opened, and the liver excised and plunged into a freezing mixture; the amount of carbo-hydrates it contained was 11·063 in a thousand parts, and of this 10·133 was starch. Certain points in these researches of Dr. Pavy will, no doubt, excite a good deal of criticism; *à priori*, it would seem improbable that the same ferment should, under the same conditions, convert both glucose and starch into maltose, since the chemical change, in the two cases, is in an opposite direction; but we will not delay to discuss this point, because a still more surprising statement remains for consideration. We will quote Dr. Pavy's own words from the communication made to the Royal Society on April 5th: "Evidence," he says, "has likewise been supplied that, by an action of the same nature as that which moves the carbo-hydrates from one to the other in the carbo-hydrate group, they are, under certain conditions, carried into a body out of the group, and thence not susceptible of being brought into glucose by the converting action of sulphuric acid; and, on the other hand, under other conditions, a substance is brought into the carbo-hydrate group, and its nature made recognisable by the converting action of sulphuric acid and its cupric oxide reducing power."

This view is, we believe, opposed to all that is at present known with regard to the behaviour of the carbo-hydrates. The chemical structure of the carbo-hydrates is simple and peculiar; and, though they have relations with the alcohol group, and through them with the fatty acids, nothing definite is known with regard to any transformation within the animal economy in that direction; still more widely do the carbo-hydrates differ in their chemical constitution from the albuminoids. The carbo-hydrates, moreover, are unstable bodies, easily destroyed by oxidation within the economy. It has always been taught that they tend to be resolved into simpler bodies, and are easily burnt up into carbonic acid and water. Dr. Pavy, therefore, will have to bring forward very strong evidence in favour of the view that the carbo-hydrates enter by combination into the constitution of more complex bodies.

Holding these views with regard to the assimilation of the carbo-hydrates, Dr. Pavy believes that, in diabetes, the action of the liver on them is reversed, and that starch is converted into glucose; and that, further, glucose is probably produced from bodies not belonging to the group of carbo-hydrates, by a a reversal of the action above referred to. It can be shown experimentally that the liver, when supplied with blood which contains an excess of oxygen, that is to say, with blood which is not thoroughly venous, can convert starch into sugar. If the liver contain a considerable excess of sugar, so also must the blood leaving it; and, when the blood contains sugar, it is always excreted by the kidneys in proportional amount. Glycosuria being assumed to be due to abnormal fermentation of the carbo-hydrates of the liver, and this abnormal fermentation being attributed to an excess of oxygen in the portal blood, Dr. Pavy propounds a theory which, by accounting for this excess, will account for diabetes. If in any area the vaso-motor system be paralysed, the circulation through that area becomes so quick, that the blood, when it reaches the veins, still has the characters of arterial blood. In diabetes, Dr. Pavy supposes that there happens a palsy of the blood-vessels of certain areas of the organs which make the chyle, and that thus the portal blood, owing to the hurried circulation which takes place in certain parts, comes to contain too much oxygen. Diabetes is a progressive disease; it may be held in check, it may seem for a time to be cured, but it always come back, and, sooner or later, its victims, by slow or rapid stages, succumb; this we are told to account for, by supposing that larger and larger areas are, step by step, involved in the palsy.

However far this theory, which is not entirely novel, may stand the test of future observations and discussion, it is at least interesting to note, that the two speakers, who by prolonged study and laborious research were best able to express well-founded convictions, looked to a dilated condition of the blood-vessels in the organs as an important factor in the production of diabetes.

On the etiology of the disease little or no light was thrown. If glycosuria should be shown to be produced by vaso-motor palsy, still we should know nothing of the cause of this palsy; conceivably it might be due to central lesion, or to a peripheral lesion of the nervous structures, or it might be due to disease of the muscular apparatus of the vessels.

Dr. Pavy's communication will attract much attention among chemists, and his views will probably be severely criticised; but of this there can be no doubt, that he has made a valuable contribution to the study of what we are tempted to call pathological chemistry, a study which appears to have few attractions for the pathologists of our day and country; but one which, nevertheless, is capable, we firmly believe, of yielding important results in almost every department of medicine.—*British Medical Journal, May* 12, 1883, *p.* 919.

21.—DIABETIC URINE WITH LOW SPECIFIC GRAVITY.

By Charles A. Cameron, Prof. of Chemistry, R.C.S.Ireland.

During the last twenty-five years I have examined many hundreds of specimens of the urine of persons affected with diabetes, and I have occasionally met with specimens having exceedingly low specific gravity. More than twenty years ago I was in the habit of periodically examining the urine of a man, about forty years old, who was under treatment for diabetes by Dr. (now Sir George B.) Owens. The specific gravity of this patient's urine usually fluctuated between 1025 and 1035, but on one occasion the gravity fell to 1005. On making inquiries, the patient assured me that the urine had not been accidentally mixed with water. The day on which the urine was voided was extremely warm, and the patient informed me that he had felt unusually thirsty, and had, to use his own expression, spent the day drinking cold water.

About twelve years ago I examined a specimen of urine for the late Dr. Ringland; I found its specific gravity to be 1008, notwithstanding which it contained 1·2 per cent. of sugar. The patient was an elderly man. On several subsequent occasions I found this patient's urine to have a specific gravity under 1015, though usually the specific gravity was from 1028 to 1035.

Two years ago I found the specific gravity of a specimen of diabetic urine to be 1007. I was not able to ascertain in this case whether or not the urine had been mixed with water, but the person for whom the analysis was made assured me that the urine had been voided into a perfectly empty vessel.

About two months ago Mr. William Stokes, Prof. of Surgery in the Royal College of Surgeons, gave me a specimen of diabetic urine which had a gravity of only 1005. There was a mere trace of urea present, and the solid matters in the urine consisted nearly altogether of sugar and chloride of sodium. Mr. Stokes stated that there was not the least doubt as to the urine being unmixed with water.

In examining urine it is always necessary to look for sugar, no matter whether the specific gravity of the fluid may be normal or otherwise. I occasionally find urine with a very high specific gravity, and with a—so to speak—diabetic appearance, to be quite free from sugar. On several occasions, in specimens of urine believed to contain sugar, I could not detect a trace of that substance. A few months ago I examined the urine of a man who had been treated for diabetes. The urine had a specific gravity of 1035, and, on being boiled with Fehling's solution, it gave a copious precipitate of cuprous oxide. There was something in the appearance of the precipitate, and in the slow way in which it made its appearance, that led me to suspect it was not produced by sugar. This proved to be the case, for, on treating the urine with yeast, no carbonic acid (save a mere trace) was evolved.

The presence of large quantities of urates in urine causes a brown precipitate with Fehling's solution. The urates, even when abundant, do not always separate as the characteristic "brick-dust." I have found very large quantities of urate of ammonium in urine which remained clear on standing, but which gave a brown precipitate on being boiled with Fehling's solution.

When testing for sugar in urine it is necessary to ascertain whether or not urates are present in large quantities. If they are they can be precipitated by the addition of hydrochloric acid; and the urine filtered or decanted from the precipitate can then be satisfactorily tested for sugar with Fehling's solution.—*Dublin Journal of Medical Science, April* 1883, *p.* 295.

22.—BEDSIDE URINARY TESTS.—DETECTION OF SUGAR IN THE URINE BY MEANS OF TEST PAPERS.

By George Oliver, M.D.Lond., Harrogate.

I wish in this paper to make a few remarks on qualitative sugar testing by means of test papers, and to reserve the quantitative methods for both sugar and albumen for another occasion. When looking round for a good and at the same time convenient test for sugar in the urine, I was particularly struck with a fact relating to indigo; and that was the presence of this intensely blue substance in a colourless state, when associated with glucose or some similar sugar; for instance, when in the juices of the indigo plants it is combined with indiglucin, which has a chemical formula only slightly removed from that of glucose; or when the dyer mixes indigo with glucose and dilute caustic alkali to produce a colourless solution, in which he immerses his fabrics, which acquire a blue colour on exposure to the oxygen of the air. It then appeared to me a reasonable question to ask, Can glucose in the urine be made in some way to discharge the deep blueness of indigo, and thus to tell the tale of its presence? Experiment gave a positive answer: for when indigo was suspended—it did not dissolve—in a weak solution of soda, or in a stronger one of carbonate of soda, a test solution was obtained, which, when heated with a few drops of diabetic urine, underwent a series of remarkable changes of colour—from blue to green, then to violet, to red, and finally to yellow. I longed to run the liquid containing carbonate of soda and indigo into filtering paper, and use it as a test paper; because, with carbonate of soda as the alkali, the test papers would have been more durable than with solution of soda. But unfortunately, after deposition on the paper, the indigo would not leave it. I then found in a work by M. Méhu a statement to the effect that when the carmine of indigo is heated with carbonate of soda, and a solution of glucose or saccharine urine, the blue colour is converted gradually into green, then into red, and finally into yellow. Carmine of indigo is the sulph-indigotate of sodium, an intensely blue and soluble salt (solubility 1 in 120 parts water). Sulphuric acid when heated with indigo produces the soluble sulph-indigotic acid, which, after combining with a base (such as sodium, calcium, magnesium, &c.), provides us with insoluble indigo as a reagent in a perfectly dissolved state. When carbonate of soda is mixed with a solution of the carmine the latter is precipitated in a fine state of division; but when shaken this mixture may pass for a solution much like that of Fehling in colour and general appearance. A perfect solution of a greenish-blue tint is, however, obtained after heating the liquid. As such it may be employed as a reliable, sensitive, stable, and non-caustic test for sugar in the urine; but on several accounts I give preference to the test papers prepared from its constituents. In their manufacture it is true that great care is required to secure throughout the filtering paper a perfectly even distribution of the sulph-indigotate; but this result has now been accomplished to my satisfaction. The papers offer the following advantages over the liquid preparation:—(*a*) Every paper is charged with the same definite quantity of the reagents; a uniformity is thus provided for the qualitative testing, which, moreover, becomes a standard of known value for the quantitative estimation. (*b*) The paper filters out a fine precipitate, so that the alkaline solution of the sulph-indigotate is perfectly transparent, and of a true blue; but, notwithstanding this fact, the colour of any remnant of the reagent left on the paper is completely discharged by the sugar, so that in the quantitative estimation the colourlessness of the paper will be found the guide as to the termination of the completed reaction. (*c*) The portability, cleanliness, and stability of these handy tests must commend them to your favourable attention. The characteristic reaction which indicates the presence of glucose in the urine, arises shortly after the first simmer of the solution prepared from the papers, a drop or two of diabetic urine having been added before the heating. Then a beautiful violet tint suddenly spreads throughout the bright-blue solution; very quickly the violet deepens, and passes into purple; this in its turn melts into reddish-purple, which gives place to various tints of red, and these as quickly merge into orange-red and orange, and finally the solution becomes of a straw colour, which remains without further change, though heated ever so long. At this point you will observe the paper of the same light-yellow colour as the liquid. You will note the complete range of this striking colour reaction embraces all the prismatic colours, and the order of the appearance of the successive hues is always the same. The reaction is one of great beauty; for the primary colours are not merely pure and sharply defined, but all the transitional and intermixed tints pass quickly before the eye in such rich profusion as one rarely sees in nature itself. Now, on shaking the tube the colours return in the inverse order to that in which they appeared. This remarkable thing is not due to cooling, but to admitting the oxygen of the air into the liquid; for the varying hues at any stage of the reaction may be caught and retained for days merely by corking the tubes full of the solution, and the return of the colours, when the test-tube is at rest, always appears first at the surface, and slowly spreads downwards, so slowly that after putting aside for some hours at least the lower half of the solution will still retain its acquired colour. Experiment has shown that the tint reached in any particular observation depends on the quantity of glucose added to the test liquid—*e.g.*, the reaction may stop at violet, purple, red, &c., and, when it thus halts, it can be easily made to proceed to the final stage by adding more of the diabetic urine, the liquid the while being kept warm. This suggests a principle on which to found a quantitative analysis. The method I propose to myself is a very simple one: it is based on the complete removal of all the colours below the pale yellow, except when the sugar exists in such small quantities as are not guageable by any known procedures, then the delicate scale provided by the different colours may be available.

If confirmation of the presence of sugar be further desired my series of test papers provides it. For when the mercuric chloride paper — otherwise required by one of the several methods for the quantitative determination of albumen—is dropped into the solution while still hot, after the complete development of the indigo reaction, there is produced immediately a blackish-green precipitate. No such precipitation occurs when a drop of non-saccharine urine is under examination by the indigo test, then the blue solution is merely turned into a transparent green one. Mercuric chloride, however, when turned to a hot solution of mere carbonate of soda containing a drop of saccharine urine is not a test for sugar; it is only so after the full development of the indigo reaction on glucose. This final stage of the testing appears to me to clinch the presence of sugar beyond doubt.

The mode of testing is important. One of the papers should be dropped into an ordinary half-inch test tube, and as much water poured in as will just cover the upper end; a column one inch in height and half an inch in diameter will thus be produced, and the solution obtained will always acquire the same concentration. Then not more than one drop of the suspected urine is let fall into the tube from a pipette, and heat is applied. After the first change of colour it is advisable to move the tube away from the flame, and merely keep its contents hot, not boiling, in the higher part of the column of heated air above the flame; then all the colours will follow in the order I have given, without disturbance from ebullition, until straw-yellow is reached, providing the amount of glucose present is sufficient to develop all the prismatic colours, if not, another drop of urine should be added. The results of the working of this test by the side of Fehling were briefly as follow:—(*a*) On always submitting one drop of urine to the indigo test, and the presence of sugar being shown, confirmation was invariably provided by Fehling used in the ordinary way. (*b*) On the other hand, whenever one drop of urine gave no reaction with the test, Fehling's solution did not give a precipitate. (*c*) On, however, taking more than one drop of urine a different kind of experience was opened up. Then with various urines a deep violet or purple tint would strike up on the addition of the second, third, fourth, fifth, sixth, or more drops, and Fehling employed in the usual way gave negative results. But I am inclined to think in the cases in which from two to four drops developed the partial reaction, that Fehling, when applied as follows, showed such a suspicious change as to almost suggest a very minute quantity of sugar; a few drops of the urine were added to a little more than the same quantity of the solution, the true blue remaining intact, and well boiled, when, though no precipitate was visible, the blue quickly turned to a decided green tint, contrasting strongly with the pure blue of the solution held by it in another test tube. I do not assert that this change of colour from blue to green was a proof that sugar slightly over the normal was present, but to my mind it is suggestive, for I could not detect such a distinct colour reaction with urines that, guided by the indigo test, I should class as normal in respect to sugar, or whatever is the cause of the reaction in such urines.

In all these cases there was unquestionable derangement of the liver, and in some there were decided or suspicious indications of gout, especially in those forms which are sometimes grouped under the somewhat indefinite term, "suppressed gout." They were just the cases in which it is clinically interesting to detect a little more sugar than the normal. In one case now under observation sugar has been detected at odd times during the past two years by Fehling used in the ordinary way; now, however, though Fehling gives no precipitate, but only the distinct green colour just referred to, the indigo test affords a very pronounced and beautiful purplish red reaction with the second drop of the urine. So far as I can at present decide, though I feel that further experience must be appealed to, normal urine, as a rule, gives a distinct violet tint after the addition of the fifth or sixth drop. From these observations I am inclined to believe that the indigo test provides us with an accurate and very sensitive means of detecting and gauging the normal sugar, and, furthermore, those variations which probably fill in the gap between the small quantity of sugar consistent with good health and the larger amount which characterises ordinary diabetes. I therefore strongly suspect this test may open up an interesting field for clinical observation which has not been compassed by the reagents hitherto employed. May it not bring within our clinical vision some new facts in relation to sugar as a symptom of several disorders, perhaps especially those of the vaso-motor nervous system and the liver?

Observation likewise leads me to believe the indigo test possesses the following advantages over Fehling:—1. It will detect sugar in any proportion in the presence of albumen, blood, pus, or bile, and as readily as in ordinary diabetic urine. In the case of albuminous urine it is therefore unnecessary to precipitate the albumen and filter. It is well known when there is much albumen and little sugar—as in this urine—the latter may be overlooked by Fehling. 2. It gives no play of colour with uric acid, though the latter can slowly discharge the colour of the test. It is well known how this constituent in the urine breaks up Fehling. 3. Alkaline sulphides (so apt to be present in stale albuminous urine) do not, so far as I have seen, affect the indigo test applied as I have suggested. 4. The stability of the test is one of some promise, and if proved by further experience—and I know nothing to cause me to doubt it—it will be a great comfort in sugar testing. Moore's, Trommer's, and Bœtger's bismuth tests are all inferior in delicacy.

The conclusions to which I am led by my observations are—(1) that the indigo test, as here presented, is a detector of glucose in the urine which possesses several points of advantage over all the old tests; (2) that it is the most sensitive of all the reagents I have tried by the side of it; and (3) that it is less liable to fallacy than the others, even though special urines—such as albuminous, purulent, and bloody ones—are not prepared for its operation by the separation of albumen, &c. As yet I have not met with anything in the urine besides glucose which brings out the characteristic play of colours. A good qualitative test should have as one of its working properties the power to easily display the coarser variations of quantity; for these are far more useful, as a rule, to practitioners than the discovery of fine gradations, which are little more than the refinements of the laboratory. This property the test before us possesses, as you will discover after putting it on its trial, and becoming acquainted with its behaviour; for, as with any new instrument, we can only discover all about it by practice. Diabetic urine for this purpose should be diluted with water—and still only one drop should be examined as before; or after the development of the complete reaction the fresh addition of a paper, or a portion of a paper may be made, when perhaps the straw-yellow will fail to appear. But each one will doubtless discover his own way to similar results. I have abstained from referring to the claims of picric acid and caustic potash, introduced by Dr. George Johnson, as compared with those of the test I here bring forward; because both—in the forms in which they are presented—are new, and their respective merits must be decided by facts and observations which can only be gathered, and trustworthily relied upon, after long and patient inquiry.

P.S.—Since reading this paper (at the Clinical Society of London, May 11th) I have found that Dr. Ralfe has lately made some experiments with ordinary indigo as a test for glucose. Dr. Ralfe informs me his results were gratifying; but, desiring to use the reagent as a test paper, he found, as I had likewise done, this idea impracticable, and for the time relinquished the matter. He informed me the test, as a liquid, was used in Germany (see Neubauer and Vogel, Sydenham Society's Transactions), and about thirty years or so ago grape sugar, he believed, was employed by manufacturers to quantitatively determine samples of indigo. If so, how unwittingly one may sketch out the opposite side of the same fact, or rather may approach it from the other side; for, instead of estimating indigo by glucose, my proposition is the reverse.—*Lancet, May* 19, 1883, *p.* 858.

SURGERY.

AMPUTATIONS, FRACTURES, DISLOCATIONS, AND DISEASES OF BONES, JOINTS, ETC.

23.—ON IODOFORM AS AN ANTISEPTIC IN OPERATIVE SURGERY.

By A. F. M'Gill, F.R.C.S., Assistant-Surgeon to the Leeds General Infirmary.

The use of iodoform in operative surgery is comparatively recent, and at present is by no means general, as many surgeons are deterred from using it by the supposed risks of iodoform poisoning. Several deaths have been reported from this cause, and toxic symptoms have been by no means unfrequent, but when we learn that surgeons have been in the habit of packing from eighty to three hundred grammes of iodoform into newly made wounds, this is perhaps not to be wondered at. After six months' experience of its use, I have come to the conclusion that its dangers have been much exaggerated, and that when properly used it is a most valuable agent.

Iodoform may be applied with advantage in four different classes of cases: (1) In old septic wounds, the result of inflammation or of traumatism; (2) in recent wounds, in the infliction of which it is impossible for the surgeon to adopt full antiseptic precautions; (3) in wounds near any of the natural orifices of the body; and (4) as an external application combined with other antiseptic dressings.

1. It has always been a matter of extreme difficulty to render putrid wounds aseptic; in some cases, as, for example, in large abscess cavities, it is well nigh impossible; when, however, the wound is of comparatively small size, iodoform may be used with great advantage. Owing to its great insolubility, its antiseptic action continues for a long time, and thus is very efficacious in destroying organisms. The following case is so remarkable that it seems worth recording:—

A child, aged five years, was brought to see me at the Leeds Public Dispensary on Dec. 6th last year. The mother stated that the child had been ill for five weeks, that the left leg had been much swollen till a fortnight before, when it burst, and discharged a large quantity of matter. On examination the leg and lower part of the thigh were seen to be much enlarged, and a red blush extended from the foot to above the knee; there was an opening which would admit the finger-tip on the outer aspect of the leg at the junction of the middle and lower thirds, which was discharging unhealthy-looking fetid pus. On passing a probe, dead bone was detected. A pair of small sequestrum forceps were passed through the wound, and a sequestrum, which involved the whole shaft of the fibula for about an inch, was removed in fragments. The wound was then filled with iodoform, and dressed with a large pad of salicylic silk. This dressing was not removed for a week. The wound was then almost closed, the redness and œdema had entirely disappeared; the dressing was renewed as before. In another week the wound was perfectly healed, and the child practically well.

2. In private practice, and more especially in country practice, it often happens that it is impossible to adopt antiseptics in their entirety, and the spray is often of necessity omitted. Under these circumstances it is important to use an antiseptic whose action is prolonged for a considerable time. It is in this class of cases that poisoning caused by the absorption of iodoform is most to be feared; the drug must therefore be employed sparingly, and rubbed with the finger over the whole of the raw surface; indeed it is unnecessary to use a large quantity, as a small amount seems to answer every purpose. I have not as yet seen any evil arise from its use when applied in this manner. It might be supposed that healing by the first intention would be prevented, but this is not the case, as I have seen many cases treated in this way heal immediately in whole or in part. The treatment of small abscesses, whether connected with enlarged lymphatic glands or simple in their origin, is much facilitated by an iodoform dressing. The abscess having been opened its cavity is filled with the powder and a salicylic silk dressing applied; this need not be disturbed for a week, when it can be renewed if necessary. The advantages of this method of treatment in out-patient hospital practice are obvious; the results obtained are excellent.

Ordinary antiseptic dressings are, as is well known, inapplicable in operations near any of the natural orifices of the body, and also in the operation of colotomy and others of a like nature. In these cases iodoform may be used either in powder or mixed with glycerine in the proportion of one part to eight. In a patient on whom I recently opened the colon in the left lumbar region this use of the drug was found of great service. In another case, after tying a large mass of hemorrhoids, I found that separation was delayed beyond the usual time; but the putridity which usually occurs under these circumstances was entirely prevented by painting with the mixture of iodoform and glycerine mentioned above.

Iodoform may be used as an adjunct to other antiseptic dressings in two ways—either to purify the skin, or to increase the antiseptic power of the dressing employed. The importance of having the skin surgically clean cannot be too strongly insisted upon, the presence of organisms on the skin being one of the most frequent sources of wound infection. This has been particularly insisted on by Dr. Ogston, who has shown that micrococci are found in great numbers in the ducts of the sweat-glands, and that dangerous consequences may supervene owing to micrococcus infection. With the object of reducing this risk to a minimum I have lately used a thin iodoform ointment or pomade, using it as an inunction to all parts in the neighbourhood of the wound. By adding tragacanth powder to glycerine, in the proportion of twenty or thirty grains to the ounce, a convenient basis is obtained, to which iodoform can be added in any desired proportion; a drachm to the ounce seems to answer every purpose. With the object of increasing the power of the dressing employed, iodoform may be used freely external to the wound. The dressing is applied in the following manner:—The operation having been completed with the usual antiseptic precautions, a strip of gauze is dipped in carbolised water and sprinkled thickly with iodoform; this is applied to the edge of the wound over the sutures. A handful of salicylic silk is then taken, and about a teaspoonful of iodoform is poured upon it; this is placed over the end of the drainage-tube. If it is probable that the discharge will be large in amount, the skin is powdered with iodoform. A pepper-box may be conveniently used for this purpose, and silk freely used wherever it is expected that discharge will collect. A pad made of silk placed between gauze, and large enough to overlap the wound for eighteen inches in every direction, is then fixed to the part with gauze bandages; the edges are secured with elastic webbing or with strapping. A first dressing applied in this manner need not usually be disturbed for from five to eight days, and subsequent dressings may be left even longer. This mode of treating wounds is in practice found to answer admirably, and this is what we would expect on theoretic grounds, for it fulfils two conditions of primary importance: it keeps the wound and its discharges aseptic and enables it to be kept at rest. An enlarged experience may possibly make me change my opinion as to the value of iodoform; at present I consider it a perfectly safe and reliable antiseptic.—*Lancet, May* 26, 1883, *p.* 902.

24.—ON A METHOD OF CONTROLLING HEMORRHAGE IN AMPUTATION AT, OR EXCISION OF, THE HIP-JOINT.

By JORDAN LLOYD, M.B., F.R.C.S.Eng., Casualty Surgeon to the Queen's Hospital, Birmingham.

The dread of hemorrhage felt by a surgeon about to amputate at the hip-joint is no mere fancy. It is a matter of great importance, and the means by which the blood-loss can be safely and completely controlled are questions of supreme moment to him. It does not follow because a problem has been found difficult of solution in the past that it may not at some future time be solved in a simple manner; and it by no means follows that because the forthcoming solution is simple it is also unreliable. The present subject furnishes a case in point. All of us must remember how a few years ago, and indeed even today, the anxious surgeon carefully applied the gigantic horseshoe tourniquet to the abdomen of his unfortunate patient, and how gratified he was when it was ascertained that pulsation had stopped in the femoral artery; the admiration and enthusiasm of his onlookers were raised to their highest pitch; the proceeding being regarded as a marvellously skilful and wonderful surgical attainment. Under the plan I have adopted all this glory vanishes; the same end is gained by what may be considered a very commonplace procedure.

On June 17th last I performed amputation through the hip-joint on a boy, ten years old, at the Queen's Hospital, Birmingham. I then employed of controlling the hemorrhage which had not, so far as I am aware, previously been used in this particular operation. The plan is, I think, simpler and safer than any of its predecessors. The amputation was practically bloodless, the hemorrhage being as completely restrained as in operations through the lower part of the leg. The limb was removed in the manner recommended by my colleague, Mr. Furneaux Jordan. The case was one of hip-joint disease, where excision six months previously had been followed by acute osteo-myelitis of the femur. The boy made a rapid recovery after the amputation, and left the hospital in six weeks.

The method I am about to describe contains no new principle; it is an adaptation of the well-known plan of circular elastic constriction which we owe to Professor Esmarch. The limb about to be operated upon should first be emptied of blood by elevation. This will occupy only a few minutes, and may be executed during the administration of the anæsthetic. Elevation combined with gentle friction towards the trunk renders parts as exsanguineous as the at times undesirable Esmarch's roller. A strip of black indiarubber bandage about two yards long is to be doubled and passed between the thighs, its centre lying between the tuber ischii of the side to be operated on and the anus. A common calico thigh roller must next be laid lengthways over the external iliac artery. The ends of the rubber are now to be firmly and steadily drawn in a direction upwards and outwards, one in front and one behind, to a point above the centre of the iliac crest of the same side. They must be pulled tight enough to check pulsation in the femoral artery. The front part of the band passing across the compress occludes the external iliac and runs parallel to and above Poupart's ligament. The back half of the band runs across the great sacro-sciatic notch, and, by compressing the vessels passing through it, prevents bleeding from the branches of the internal iliac artery. The ends of the bandage thus tightened must be held by the hand of an assistant placed just above the centre of the iliac crest, the back of the hand being against the surface of the patient's body. It is a good plan to pass the elastic over a slip of wood held in the palm of the hand, so as to diminish the pain attending the prolonged pressure of the rubber bandage. In this way an elastic tourniquet is made to encircle one of the innominate bones; checking the whole blood-supply to the lower extremity. The elastic bandage may be secured above the iliac crest in the usual manner with tapes, and may be prevented from slipping downwards by being held with a common roller tied securely over the opposite shoulder. Experience has shown, however, that no mechanical means answer so well as the hand of a trusty assistant. When the band is once properly adjusted, the assistant has only to take care that it does not slip away from the compress or over the tuber ischii. The former is prevented by securing pad and tourniquet together with a stout safety pin; and the latter by keeping the securing hand well above the iliac crest, or even more safely by looping a tape beneath the elastic near the tuber ischii, passing behind it under the sacrum and having it held in that position. The solid rubber tourniquet may be used instead of this bandage. I prefer, however, the bandage. The soft parts are less damaged by reason of its greater breadth and it is less likely to roll off the compress placed over the external iliac.

The ligature, being altogether above the limb, is out of the way of the surgeon in any operation at or about the hip-joint. The great trochanter is fully exposed; the hip being free upwards as far as the iliac crest and inwards to the perineum. The plan is equally applicable in amputation by transfixion or in excision of the joint, as in the case above alluded to. All previous operators have controlled the blood flow during hip amputations by an apparatus adapted in some manner to the abdomen, except in the case of the ingenious rectal lever recently introduced to the profession by Davy. Esmarch himself says in his Surgeon's Handbook "aortic pressure must be employed for disarticulation and excision of the hip." He recommends either Pancoast's or his own abdominal tourniquet; both instruments being similar in principle. He describes several methods of compressing the aorta by a circular elastic bandage applied round the loins, and of these Brande's is undoubtedly the best.

The latest and probably a better procedure than any of the above is Davy's plan of compressing the common iliac artery by means of a wooden lever introduced into the rectum. The following advantages are claimed for it by its inventor over all apparatus which acts upon the aorta through the abdominal parietes:—1. There is less disturbance of the general circulation, as that of the affected limb only is interfered with. 2. There is no interference with abdominal respiration; a very important gain in patients under anæsthetics. 3. There is less danger of injuring the abdominal contents. 4. Less pressure is required to control the blood stream through the common iliac artery than through the aorta. 5. The instrument is less likely to get displaced. 6. It is more rapidly and easily manipulated. 7. It is cheaper and more durable.

All these advantages hold good in the case of Esmarch's bandage as I apply it, most of them in a greater degree than when the lever is used. The bandage has, however, the following additional claims over the lever:—1. The simplicity and certainty of its application; no previous experience being necessary to compress the vessels there is no possibility of going wrong. 2. The security with which the vessels are controlled, regardless of the movements of the patient or manipulations of the operator. 3. The freedom from danger of injury to the rectum or abdominal contents. (Davy related a case at a recent meeting of the London Clinical Society, in which he himself had wounded the rectum with his lever; the patient dying on the following day of peritonitis.) 4. Its applicability to cases in which the rectal lever could not be employed, as in strictures of the bowel, intra-pelvic growths, and arterial abnormalities. 5. It requires no special apparatus.

I have adopted the method in a case where I stretched the sciatic nerve; the operation, being bloodless, became extremely easy. I have used it with similar advantage in investigating an obscure case attended by the presence of chronic sinuses about the great trochanter; caries of the outer surface of the innominate bone was detected as the cause. I have applied it in a recent case of excision of the hip. Venous hemorrhage of a trifling amount occurred in this case; it proceeded, however, from the tissues below the ligature, and was due to the limb being imperfectly emptied of blood before the band was adjusted.

My colleague, Mr. Bennett May, kindly gave me an opportunity of employing the method in a case of amputation at the hip-joint on Dec. 17th. The patient was five years old, and was suffering from acute osteo-myelitis of the upper end of the femur. Disease had extended to the joint, and was threatening death by the foulness and profusion of the discharge. The limb was thoroughly emptied of blood by elevation and friction. A double layer of Esmarch's bandage was used in the manner above described. About two drachms of blood escaped from the posterior flap only. The band was in position for nearly fifteen minutes, all visible vessels being secured before relaxing it. There was no arterial spurt throughout the operation. The child, already in a desperate condition before amputation was performed, died from shock about ten hours afterwards.

By the kindness of my friend Mr. Spofforth, of Kidderminster, I was afforded an opportunity of trying the plan at the Kidderminster Infirmary on Oct. 8th. The case was one of amputation at the right hip-joint for morbus coxæ. The patient was a man twenty years of age. After Esmarch's bandage had been rolled from toes to groin I applied the elastic in the manner above described. The hip-joint was first explored through a 5-in. incision made above and behind the trochanter, with a view of performing excision if the state of the bones would allow of it. Affairs were so bad, however, that Mr. Spofforth at once proceeded to amputate by Furneaux Jordan's method. The time occupied from the first incision to the ligature of the last vessel was twenty minutes, and the amount of blood lost was about three ounces. This loss, greater than I had previously seen, came entirely from the hinder part of the exploratory incision, and was due to the posterior half of the bandage being insufficiently tight. This was readily remedied by firmer traction, and the bleeding completely restrained. The patient made a rapid recovery, and left the infirmary in five or six weeks. This patient, being a well-built adult, I was led to use the elastic band in three folds instead of two, thinking, perhaps, that the latter would not exert sufficient pressure. It is quite unnecessary, however, to use more than two layers to control any bleeding efficiently; a greater number has the disadvantage of acting extremely painfully upon the hand which is holding them. The circulation throughout the largest vessels may be controlled by slighter pressure than is generally adopted. Esmarch's bandage and tourniquet are, as a rule, put on unnecessarily tightly. Arterial walls are soft elastic tubes, and a very moderate pressure is sufficient to check the current through them.

I submit this method to the profession feeling every confidence in its reliability, having applied it in seven operations—viz., three amputations at the hip-joint, one excision, one nerve-stretching, and one exploratory. Some of these cases were in the practice of my friends; it has pleased them equally with myself.

P.S.—Since writing the above I have had a fourth case of amputation at the hip-joint in a girl aged twelve years. The operation was performed on April 7th. Scarcely any blood was lost, and she is now nearly convalescent.—*Lancet, May* 26, 1883, *p.* 897.

25.—ON THE COMBINED USE OF THOMAS'S AND FURNEAUX JORDAN'S LAMINATED SPLINTS.

By E. Stanmore Bishop, M.R.C.S., Surgeon to the Ancoats Hospital and Ardwick and Ancoats Dispensary, Manchester.

In the British Medical Journal (*Retrospect*, vol. 86, p. 168) the use of laminated plaster splints is recommended and very clearly described by Mr. Furneaux Jordan. He advises their use in Pott's disease of the spine, in hip-disease, fractured femur, contracted knee, &c.; and he points out the fact, which must be at once patent to every one, that their application requires only one movement of the patient—namely, that on to the surface of the splint; and does away entirely with the very great annoyance and source of non-success in cases of fracture of the neck of the femur, that of constant relifting of the patient as each successive turn of the bandage has to be carried around the back.

In this communication, I wish to deal entirely with cases of hip-disease and fracture of the neck of the femur. There are good reasons for bracketing these two classes of cases together. First, in both there exists a necessity for some method of dressing which will allow the patient quickly and safely to get up. In hip-disease, the patients are generally already marasmic, and fresh air and a modicum of exercise are of immense importance to them. In fracture of the femoral neck, the accident usually occurs in elderly people, who bear confinement badly. Secondly, in both there exists a necessity for absolute immobility at the hip-joint.

If these reasons be taken together, it will be seen that a method of treatment which will suit the one, cannot be far wrong if applied to the other. This being granted, two methods naturally occur to our minds as being most likely to fulfil the indications presented; and both, at first sight, and on reading the papers of their introducers, appear the thing required. I refer, of course, to Thomas's splint, and to some form of plaster apparatus, of which, without doubt, Jordan's laminated splint affords the best example.

I suppose that no method has ever perfectly fulfilled the hopes and predictions indulged in by their authors; no practice of any plan proposed is so entirely *couleur de rose* as the original theory; and I wish to indicate certain points in which both these methods are likely to disappoint those who trust to either entirely—points in which, when used conjointly, each supplies the other's defect; then, as in some combinations of drugs, powers reside which are sought for in vain when these are separate—I will show that this conjunction renders possible a control over the limb, and, through it, over the joint, which cannot be obtained when either is used singly.

From my own observation, I should say that most surgeons pay but little attention to the actual measurements given by Thomas as to the thickness of his splints; or surely the weight of them would have been objected to long since. Probably, in the majority of cases, the size and weight are left to the instrument-maker, who proceeds on common-sense principles. In other cases, especially in the country, the surgeon will choose his iron in the most convenient blacksmith's shop, and be guided by his own ideas as to the weight his patient can carry, having it afterwards covered and padded by the local saddler; but, if any one who has been doing this. with comfort and ease to his patient and satisfaction to himself, come, like myself, to have to dictate actual thicknesses and widths of iron to a professional-instrument-maker, and take them direct from Mr. Thomas's work, he will be amazed to find that he will have a splint which is so heavy that, in the majority of cases, instead of thereby enabling his patient to get up, he has still more certainly condemned him to bed, as the only place in which its weight can be supported.

When we consider that a child with hip-disease is already weakened and emaciated by the pain it is suffering, or has suffered, that its muscles are more or less degenerated by the state of tonic contraction in which they are kept by the irritation of the branches of their own nerves supplied to the joint, as demonstrated by Hilton, it is perfectly evident that we have not much to fear from any sudden or powerful contraction of them; and that the minimum amount of weight, compatible with the requisite rigidity, will be most conducive to the second object of the splint, that of allowing the patient fresh air and exercise.

The amount of weight in a splint made for me, according to Thomas's directions, for a woman aged 26, was 4lbs. 5oz., and she could only bear it on when in bed, or, if standing, for a few minutes.

Rigidity, too, may be equally obtained by making the hinder rod still thinner, and supplementing its action by the side-rod recommended by Morris, in the last edition of Holmes's Surgery. He, however, merely carries the side-rod to the thigh clip; whilst, for a reason which will be presently evident, I prefer to carry it to the lower or leg clip.

But, apart from the weight, Thomas's splint has another drawback—its readiness to slip round; and the bad effects of this are far more evident when we have cases of fractured neck of the femur to deal with than in hip-disease. It does not fit closely to the body—closely, that is to say, in the sense of having any particular grip upon it. As I read Mr. Thomas, he seems to think that the way in which the upper or body clip is fixed or bent on the opposite side to the disease will suffice to prevent this. I can only say that I have never met an instrument-maker who could give it this knowing set or bend; and that, in one or two cases in which this was supposed to be done, the patient complained so forcibly of the impediment caused to the free action of his ribs, that the cunning bend had to be unbent, as the lesser of two evils, and the irritating tendency to swing round remained as before.

This, I take it, is practically the great drawback in the use of Thomas's splint; the weight can be regulated, but how is the tendency to slip round to be remedied?

Before answering this question, I should wish to examine the working of Jordan's laminated plaster. Will this take the place of the other? Are there no faults to find with this?

The laminated plaster, as I began by saying, has a great advantage over all other methods, except perhaps the Bavarian, of applying plaster-of-Paris, in that the position of the limb can be fixed once for all, and not interfered with again until the plaster has set. It is light, can be well padded, and, when dry, fits closely and firmly to pelvis and limb. Can anything further be required?

Well, practice does not bear out its perfect rigidity. It is extremely difficult to keep that part of it which is most important, the flexure of the hip, firm and uncracked; indeed, I may say I have never seen one that fully bore out its theoretical advantages. This, no doubt, may be due to several things: bad plaster, unskilful application, &c.; but, in ordinary practice, the fact remains that these splints frequently fail to give satisfaction from this sole fact, that they, as ordinarily applied, have not sufficient rigidity.

Still, they have a good grip of the body and the limb; they have no tendency to slip round, are light, and add no appreciable weight to the burden the patient has to carry.

Thomas's splint, then, has for *advantages:* perfect rigidity; no possibility of flexion or extension at the hip-joint; for *disadvantages:* weight, if made according to the original directions; want of actual grip; and tendency to rotation around an axis represented by a line drawn upwards through the main axis of the limb.

Jordan's splint has for *advantages:* lightness; actual grip of the pelvis and limb; and no tendency to rotation; for *disad-*

vantages: want of rigidity; danger of flexibility over the most important point.

As tabulated, each shows strength exactly where the other is weak. This alone might appear to point to the advisability of their combination; but I would wish to point out that such combination has one or two definite advantages. And first, as to the way in which they may be used together. It is not enough that the one should be merely superimposed upon the other; not so are the best effects of their united action to be obtained.

In making the Thomas's splint use iron of No. 15 gauge, for the uprights; No. 21 for the clips; and, in fixing the uprights, let the hinder one be placed as Thomas recommends, following his line. In addition to this, let a second be fixed so as to lie in the mid-line of the side of the body and limb, hollowing it out in a curve over the trochanter, and riveting it to each of the three clips. It requires no padding, but a simple covering with leather, for the sake of appearance; straps and buckles as originally directed.

As to the laminated plaster, cut out five or six sheets of the stiff muslin used; the inner two require nothing further beyond saturating with plaster; but the outer three or four should have slits cut in them, the width of half-inch tape, and directly opposite the iron uprights. Two slits, *i.e.*, one opposite each upright, should be cut in three places: *a*, midway between the crest of the ilium and the trochanter; *b*, midway between hip and knee; *c*, two inches below knee. The *a* tape should also have another point of exit in front, by means of which it should be attached to a ring on the front strap of the upper clip. Now, lay the tape between the inner two and outer four sheets, allowing a good loop to pass out at each slit; and having saturated the sheets with plaster, and properly moistened them, lay the patient upon the whole.

Fix the plaster splint carefully and allow it to dry, carefully drawing out each loop as far as it is free, and dividing.

Thus, the upper tape will have three points of exit from the plaster splint: one behind, opposite the upright representing Thomas's original upright; one on the outside of the limb affected, opposite the additional upright; and one in front, opposite a ring attached to the strap connecting the upper or chest clip. The free ends of tape projecting from these openings are to be made fast to the points of Thomas's splint indicated; and thus that splint can be rendered perfectly firm and immovable.

The two lower tapes have each two points of exit, both opposite the respective uprights. Now it can easily be seen that, if the position of the limb with reference to the trunk be correct, by fastening these tapes such position is maintained; but, should there be too great eversion, by drawing the outermost tape up and over the anterior surface of the leg, until, by passing round the inner side, it reaches the hinder upright, passing around this and drawing upon it, any amount of traction can be exerted and maintained by fixing the tape in this position; such tape cannot injuriously compress the tissues of the leg, as it is warded off them by the stiff plaster casing. Inversion can be treated in the reverse manner.

Thus, then, the combination of the two splints permits of definite regulation of the amount of eversion or inversion of the limb. The upper part of the outer instrument is fixed in a definite position, from which it is impossible for it to slide; whilst the lower is thus made available as a rigid point or points, to and from which the leg can be drawn and fixed.

Such control over the position of the limb, as to rotation, is impossible with either of these appliances separately; combined, it is at once practicable and easy. To sum up: the advantages to be gained by the combination of the two splints are these.

1. It becomes possible so to lighten the weight of Thomas's splint that it can easily be borne by the weakest patient; and the weight of the laminated plaster is so inconsiderable, and so diffused over a large area, that the combined splints weigh about half the amount of an ordinary Thomas's splint, made after the original directions.

2. Whilst the Thomas's splint supplies the requisite impediment to flexion and extension of the hip, the laminated plaster supplies the firm grip of pelvis and limb, and forms an admirable *point d'appui* for any attempt at adjustment, in cases of fracture.

3. The combination permits of a more certain fixation of Thomas's splint itself, in any desired position; and renders it not merely a safeguard against flexion and extension, but a very certain appliance for remedying excessive rotation, either external or internal.

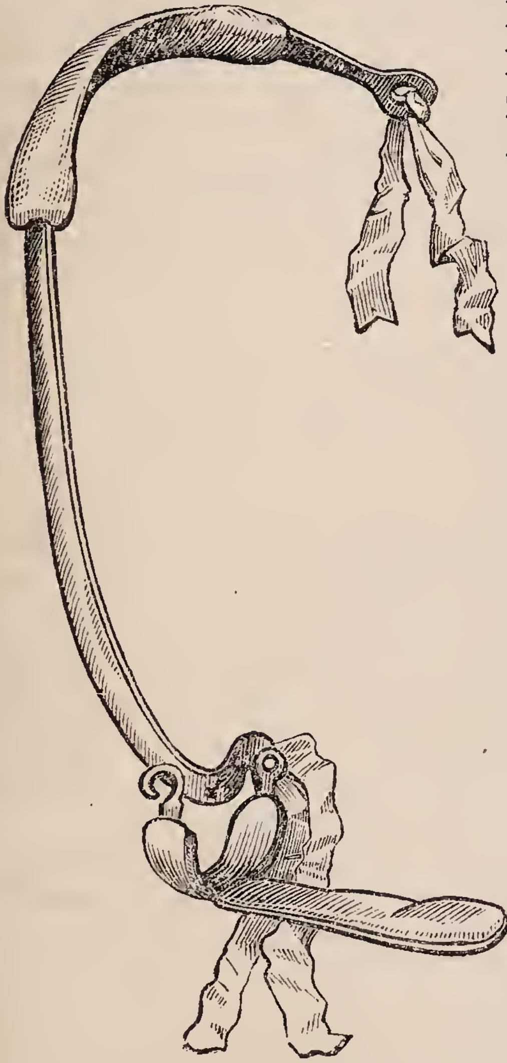
Of course, the patten on the opposite foot, the crutches, etc., are equally necessary, as they would be with the Thomas's splint alone.—*British Medical Journal, July* 7, 1883, *p*. 8.

26.—ON A SIMPLE SPLINT FOR THE ELBOW.

By Norman Porritt, L.R.C.P.Lond., M.R.C.S.Eng., Huddersfield.

Cases of injury and disease in and about joints are among the most important and occasionally the most difficult and trying cases the surgeon has to deal with, and there is a class of injuries to the elbow-joint whose characteristic is rapid and great swelling around the joint. Unless such cases are seen almost immediately after the accident, it will be difficult, and often impossible to determine the exact nature of the injury, for, in addition to the swelling, tenderness on manipulation will have supervened. When there is a dislocation of the elbow, or a complete fracture across the lower end of the humerus, the diagnosis is not, as a rule, long delayed; but my remarks refer to cases of partial fracture about the elbow without displacement, and to other cases characterised by inordinate swelling, whose nature is at best obscure.

For such cases the splint here figured was devised. It consists of a flat bar of iron bent at one end to rest easily on the shoulder and back, and modified at the other to support the hand. The end of the shoulder-piece rests over the base of the scapula, on a level with the upper border of the axilla, and is secured by a bandage passed from it over the opposite shoulder, over the front of the chest, through the axilla of the affected side, and thence horizontally once round the body, between the end of the splint and the first turn of the roller over the shoulder. It is then tied. Thus the end of the splint is immovably fixed, and cannot slide either upwards or outwards.



The elbow being bent at a right angle, the hand is secured to the other end of the splint, and rests easily and comfortably on the support provided for it.

Applied thus, the shaft of the splint extending from the anterior axillary fold to the wrist forms the base of a triangle whose sides are respectively the arm and forearm, the apex being at the elbow. There is, therefore, considerable space between the elbow and the shaft of the splint. The splint moves on the fixed posterior extremity as on a pivot, and it will be found that, although the splint and limb can be raised and moved as a whole in various directions, the elbow is fixed, and its movements impossible.

Fixation of the elbow is commonly effected by bandaging the arm to a rectangular wooden splint, a procedure which, in the class of cases briefly described above, aggravates the swelling by the pressure of the bandages above the joint. When the iron splint is applied, bandages encircle only the thorax and wrist, and do not compress the venous channels over-handicapped by the sudden effusion. A state of physiological as well as physical rest, which cannot but be beneficial, is thus effected.

But the use of the splint is not limited to cases of injury. A case of synovitis which made no progress whilst the limb was bound to an ordinary rectangular splint, at once improved when the iron splint was substituted. During convalescence after excision of the elbow, and in cases of disease of the elbow, especially when bony ankylosis is desired, it is also of service. The space between the elbow and shaft of the splint permits the application of dressings, or allows incisions to be made without disturbing either limb or splint. The splint acts as a sling, the weight of the arm being supported by the shoulder; it is thus comfortable, and one patient wore it continuously with benefit and comfort for eight months. It is not taken off at night, and the shoulder-piece can be effectually concealed within the arm-hole of the vest or dress, and, as a rule, patients prefer it to the wooden splints.

Messrs. Arnold and Sons, of West Smithfield, E.C., make the splint, with padding for the shoulder and handpieces as shown in the drawing.—*Med. Press and Circular, May* 16, 1883, *p.* 420.

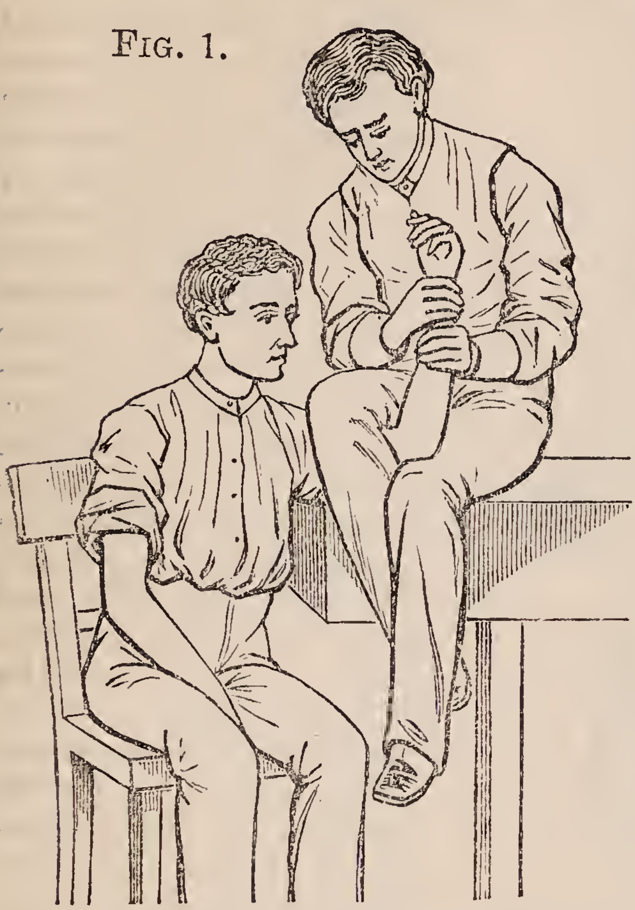
27.—A NEW METHOD OF REDUCTION IN DISLOCATIONS AT THE ELBOW-JOINT.

By James E. Kelly, F.R.C.S.I., M.R.I.A., &c., Dublin.

Dislocations at the elbow-joint are generally reduced without much difficulty, but the operator occasionally encounters an amount of resistance which demands the application of the pulleys or the aid of assistants. In other instances, in which a complicating fracture is suspected or recognised, considerable force may be essential to the diagnosis or the treatment, and it is expedient that, while perfectly under control, this power should be applied with great steadiness. Again, in long-standing dislocations, accompanied by extreme rigidity and consequent loss of function, authority, with the object of permitting efficacious treatment by passive motion, sometimes sanctions the fracture of the olecranon process. In any of those contingencies the following procedure permits of the necessary treatment in the most satisfactory manner.

The operator sits on the corner of a table, at the end of which the patient is placed upon a chair (Fig. 1). The injured

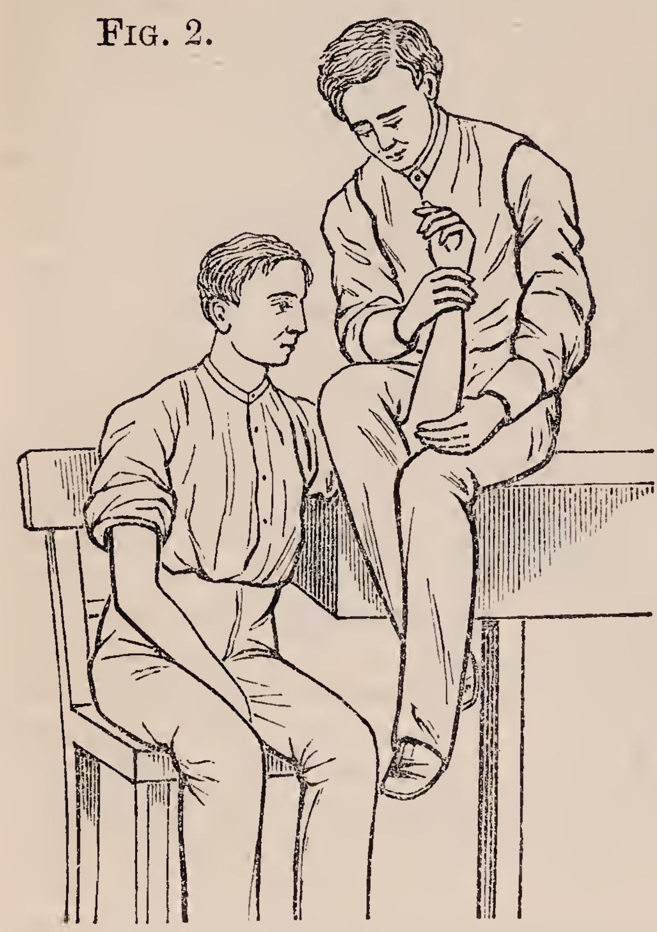
FIG. 1.



limb is drawn under the surgeon's proximal thigh, which rests, close to the joint, on the anterior surface of the humerus, while the olecranon is accurately placed on the anterior surface of the lower third of the distal femur, and the proximal foot is "hitched" behind the other leg, which is flexed firmly against the frame of the table. In order to obtain the most favourable fulcrum, the surgeon fixes his proximal elbow against the antero-internal aspect of his corresponding thigh (this is not correctly shown in Figs. 1 and 2), and, grasping the wrist of the patient with both his hands, reduction is effected by the simultaneous and co-operative action of the muscles of the arms, back and thighs. Fixation and counter-extension are supplied by the powerful thighs of the operator, and coaptation is effected, with great nicety, by the backward pressure of the proximal femur against the anterior surface of the humerus, while the distal femur forces the olecranon forwards. Owing to the accuracy with which it can be applied, this power, which is incalculably greater than that afforded by the pressure of the fingers and thumbs (Boyer), is sufficient, when the forearm is steadied, to reduce an ordinary dislocation without the aid of extension. Additional adjusting influence is exercised by the inner side of the proximal thigh, which by pressing against the anterior surface of the forearm, liberates the coronoid process from its position behind the lower extremity of the humerus, and allows the greater sigmoid cavity to resume its normal relation to the trochlea. Extension is supplied by the muscles of the upper extremities acting round the fixed point provided by the elbow of the surgeon, and, when his body is thrown backwards, additional force is derived from the muscles of the back, the glutæi, and the other extensors of the thighs. This power may be applied at various angles in rapid and easy succession, an advantage which the surgeon experienced in the treatment of dislocations cannot fail to appreciate.

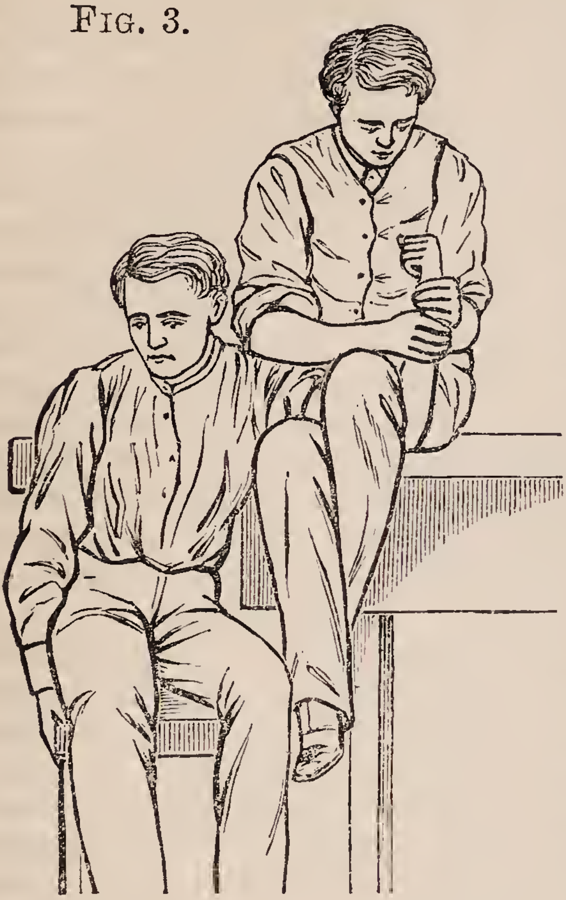
In the lateral modifications of the posterior luxations the reduction is generally effected by the same manœuvre which is employed for the simple form of dislocation, but should special coaptation be necessary, it is at the disposal of the operator, as, when aided by the powerful constraining pressure of the thighs, the proximal hand can supply sufficient traction and stability, while the other is unoccupied and in the most advantageous position to apply any additional manipulation (Fig. 2), which may, if desirable, be afforded by an assistant. If the condition be such that the full extending force of both arms be required, the isolated rural surgeon can, with a little ingenuity, render himself independent of professional aid by fixing the bone of the arm or forearm, which is displaced inwards, by a bandage passing round his own loins, and by making lateral traction on the bone or bones displaced outwards, by another bandage attached to his foot, and passing over his knee, as over a pulley. By this simple apparatus the instinctive movements, which are essential to the reduction of the simpler luxations, are utilised for the treatment of the more complicated forms.

FIG. 2.



For the anterior dislocation, of which the writer has had no personal experience, the following modification of the foregoing method is proposed, as being rational and obviously advantageous. The operator and patient being placed in the same relative positions (Fig. 3), the arm of the latter is passed *over* the proximal thigh of the surgeon, while his distal thigh is placed in the anticubital fossa; the distal foot is "hitched" behind the other leg, and the proximal elbow placed upon the shoulder of the patient. The arm being fixed, and the forearm pressed against by the distal thigh, the operator, grasping the wrist as in the former manœuvre, makes traction upon it in the most desirable direction, and, flexing the forearm over the thigh, he liberates the olecranon from the anticubital fossa, when the reduction is completed by the spasmodic action of the patient's triceps, aided, if necessary, by the operator, who forces the forearm backwards.

Fig. 3.



In addition to the desire to place at the disposal of the surgeon another method of dispensing with pulleys, assistants and anæsthesia, the purpose of this paper is to direct attention to the undeveloped mechanical resources of the human body. The utility of the powerful muscles of the lower extremities in supplementing the strength of the upper, is a topic worthy of consideration, and experience has enabled the writer to commend it most warmly to the attention of his professional brethren. — *Dublin Journal of Medical Science, July*, 1883, *p.* 1.

28.—ON DISLOCATIONS OF THE THUMB.

By J. E. Kelly, F.R.C.S.I., Surgeon to Jervis-st. Hospital; Lecturer on Surgery, Ledwich School of Medicine, Dublin.

[Dislocation at the metacarpo-phalangeal articulation of the thumb is a subject of such persistent interest that we give Mr. Kelly's valuable paper nearly entire.]

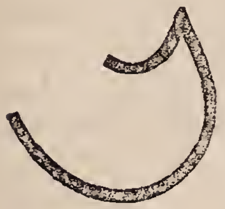
The numerous hypotheses which have been advanced to explain why this dislocation should be, as Sir Astley Cooper avers, "the most difficult to reduce," may be summarised as follows:—The cuneiform or clubbed head of the metacarpal bone: the mechanical resistance and change of direction, of the lateral ligaments; of the tendons of the short muscles: the interposition between the metacarpal head and the base of the first phalanx, of the sesamoid bones; of the anterior ligament; of both the last-mentioned; of the tendon of the flexor longus pollicis: the constriction of the neck of the metacarpal bone, by the boundaries of the "button-hole" slit; in the substance of the anterior head of the short flexor: the contraction of the numerous muscles which act on the phalangeal portion of the thumb, and the difficulty of applying efficient mechanical force to the limited and unstable structures which are displaced.

In the varieties of this injury the degree of dislocation depends, in posterior luxation, on the extent to which the head of the bone is permitted to escape from the articular fossa, by the rupture of the attachment of the anterior articular wall and of the lateral ligaments; and of the posterior ligament, in the anterior form. The difficulty of reduction is determined by the integrity of the anterior or posterior wall of the articular fossa, and the degree to which it is displaced from its normal position to the opposite surface of the metacarpal head; the most intractable form being that in which the strong anterior wall (consisting of the sesamoid bones and their connecting structures, the anterior ligament, and their connections to the lateral ligaments and to the tendons of the short flexor) remains intact, and is drawn completely behind the head of the metacarpal bone; the most powerful extension serving only to depress those structures all the more firmly on the articular surface of the phalanx, which is closed by them as perfectly as a box is by its cover. Assuming that the transposition is complete, the less the lateral ligaments are lacerated the greater is the immobility, and consequently the more difficult is the reduction. In the anterior form a similar condition exists, but, owing to two circumstances, the reduction, although sometimes impracticable, is generally effected more easily—(1) the posterior ligament is less resistant, and (2) the convexity of the articular surface being on the anterior aspect of the bone, which is that opposed to the ligament, allows the latter to glide more easily from its abnormal position.

The most frequent condition of the parts in complete posterior dislocation (Hey) is as follows:—The phalanx is drawn upwards on the back of the metacarpal bone, the head of which projects forwards. The anterior ligament is torn from its upper attachment, and lies, without the other structures constituting the anterior wall of the articular fossa, between the base of the phalanx and the metacarpal bone; the posterior ligament is separated from the periosteum of the metacarpal bone to an extent depending on the degree of displacement; the external lateral ligament is entirely torn, or its anterior margin, where the tension is greatest, is lacerated; the internal lateral ligament is generally uninjured, thus influencing the inclination inwards, and the rotation, of the phalangeal portion of the thumb. The extensor tendons are relaxed; the tendon of the long flexor is either lying loosely to the inner side of the metacarpal head, or insinuated between it and the base of the phalanx, its position being most probably contingent on the persistence or laceration of the fibrous tissue which attaches the theca to its anterior ligament. The abductor and adductor muscles are but slightly influenced except by the change of their direction, consequent upon the displacement backward of their insertions; the inner or deep head of the flexor brevis is intact, and the outer or superficial is tightly strained round the external surface of the neck of the metacarpal bone, with or without laceration of some of its substance. Here it is well to consider the anatomy of the "buttonhole" slit. This opening has been described as existing in the "capsule," a term which most probably refers to the anterior ligament, which is too limited a structure to afford a collar to the metacarpal bone. The "buttonhole" proper is placed between the lower portions of the short flexor, which form its lateral boundaries; the upper extremity of the aperture is limited by the slip, unless it is lacerated, from the inner head of the flexor brevis, which joins the outer insertion, and by the aponeurotic bands which traverse the muscle. It is evident that neither by their mechanical resistance, nor by their contraction can any of those boundaries offer such insuperable difficulty to the reduction as is so frequently experienced, because laceration would readily remove the former, while anæsthesia would quickly dispose of the latter. Therefore, it is to the inferior extremity of the slit that one must look for the elucidation of this surgical paradox, and an investigation of the foregoing anatomical details compels us to recognise, as the cardinal difficulty in reduction, the interposition between the bones of the passive anterior wall of the articular fossa.

The following manœuvre, which was first employed more than ten years ago, consists of the addition of circumduction to a methodised combination of recognised expedients, namely —(1) increasing the deformity by bending the phalanges backwards; (2) pressing on the projecting ends of the bones: (3) applying a rocking or zigzag motion to the phalanges; (4) rotating them inwards; (5) flexing them towards the palmar surface, and, if necessary, (6) the application of extension. It is well to realise that reduction is effected by constraining the projecting extremity of the metacarpal bone, to retrace its course through the "button-hole" opening, and to resume its position within the deep articular fossa. Reflecting on the term "button-hole," which is so generally applied to this aperture, it is interesting to observe the resemblance which this expedient bears to the unbuttoning of a coat, by drawing the most convenient margin of the yielding buttonhole round the projecting portion of the rigid button. The head of the bone corresponds with the button, and the slit to the yielding material—the most convenient and freest margin being the outer, the inner being generally fixed, by the persistent lateral ligament, to the internal side of the metacarpal head—which is also the narrower, a circumstance of which advantage is taken. The operator, grasping the thumb and attending particularly to the immobility of the metacarpal bone, having fixed the injured member in the flexed position, (1) presses his own thumb against the displaced phalanx, and bends the patient's backwards almost to a right angle, with a slight inclination inwards; the base of the phalanx is then moved along the internal margin of the posterior surface of the metacarpal bone, with a rocking motion until it reaches the inner edge of the articular surface, closely followed by the thumb of the operator, to prevent retraction and to aid by impulsion; when (2) adducting suddenly the base with a slight movement of its narrow inner margin upwards, to "hitch" it behind the internal lateral ligament, and rotating it inward, with the pressure applied chiefly to its external condyle, to impel it obliquely from above, forwards and inwards over the articular surface, and to force the outer boundary of the "button-hole" over the metacarpal head, while (3), extending the wrist, the operator gradually flexes the phalanx and sweeps the middle part of its base along the anterior articular margin until it reaches, in full flexion and abduction, the prominence for the external sesamoid bone; when (4) the phalanges are extended in a straight line with the metacarpal bone. Should additional extension be required an assistant can supply it in the most favourable manner, without interfering with the manipulation, by throwing a loop of strong tape round the posterior surface of the phalanx while it is in the angular position, and drawing it towards the inner edge of the metacarpal surface. The wrist is flexed during the first stage to relax the anterior muscles, the extensors being already relaxed by the position of the base of the phalanx, and, extended during the second stage to permit of free circumduction, by relaxing the extensors, and because the tension thus produced by the short muscles is at this stage favourable to the traction forward of the base of the phalanx, and to the liberation of the anterior articular wall. The phalanx is brought to a right angle, and circumducted on the internal lateral ligament to displace, if necessary, the tendon of the long flexor and to induce the upper detached margin of the anterior ligament to pass from its position, between the bones, over the narrow inner edge of the metacarpal head, and it is swept round the anterior margin as far as the prominent external condyloid eminence to complete this transposition, and extended at this point that the projection may hook forward the ligament and allow the head to resume its position within the deep articular fossa. It is well to observe that in the second and third stages two movements of circumduction are employed which coincide at a point posterior to the internal lateral ligament, the first passing inwards and upwards, with a sharp curve, and the second inwards, downwards, forwards, and outwards. They are represented by the accompanying diagram, Fig. 1, which indicates the curves for the left thumb.

FIG. 1.



Should mechanical aid be necessary when a special thumb forceps is not available, the accompanying engraving represents a clamp, Fig. 2, which will prove an efficient substitute. It consists of two pieces of wood about six inches long and half an inch broad, which are connected, not too tightly, at one end by a cord, close to which are transverse concavities to receive the first phalanx. It is made more secure and less painful by a strip of lint being wound round the grasping portions. It can be applied to the first phalanx, between the prominences of the head and base, and, by permitting the flexion of the terminal phalanx, it favours the relaxation of the tendon of the long flexor. It affords a firmer grasp than that derived from any forceps, retractor, or other apparatus with which the writer is acquainted, except that of M. Farabeuf, which has the same advantage as to the grasp, but is inferior in only allowing rotation on its axis, whereas this simple apparatus affords most powerful leverage. Should the operator wish to have both his hands at liberty to conduct the manipulations, he can secure that of the patient in a larger clamp of the same description, having, instead of the concavities to receive the phalanx, two bulbs, which may be easily added by rolling lint or worsted round its limbs in such a position that they will fix the first metacarpal bone immovably by pressing against it anteriorly and posteriorly; or if its flexion towards the palm be preferred, they may be applied to it and to the fifth metacarpal bone. This larger clamp, which will be found useful in many minor operations on the hand,

FIG. 2.

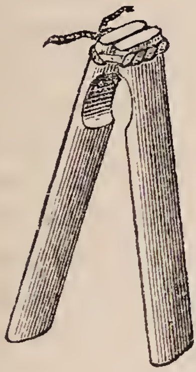
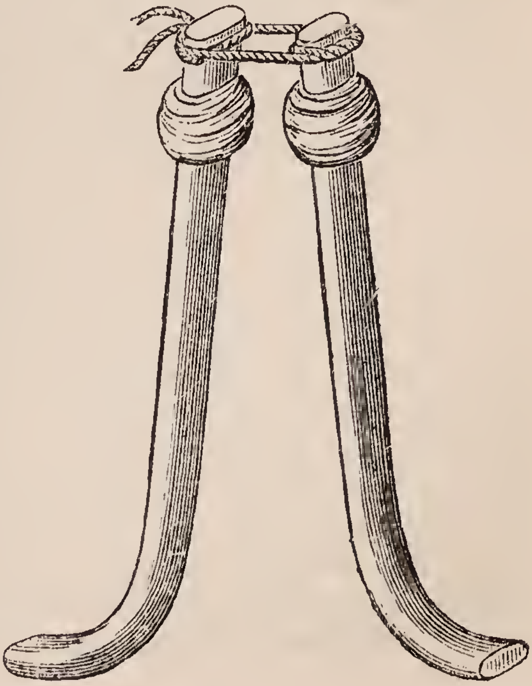


FIG. 3.



can be held between the knees of the operator, to which it can be attached more securely by a few turns of a bandage, or by being curved, as in Fig. 3.

As the most serious resistance to reduction is due to the passive interposition of the anterior wall of the articular fossa, which retains its malposition independently of its lateral attachments, it is evident that the section of the lateral ligaments, the tendons of the short flexor, or of all those structures, as has been proved by unsuccessful operation, does not materially aid in the reduction, while such an operation. performed anteriorly, is difficult, dangerous, and permanently injurious to the functions of the joint. If the intelligent trial of reduction by manipulation should fail, a subcutaneous operation on the posterior surface might be adopted, which is rational, easy, and safe, and which should not be such a source of persistent weakness. To the outer side, of, or between the extensor tendons, a tenotome might be passed through the skin down to the anterior margin of the base of the phalanx and through the intersesamoid space, until it would reach the back of the metacarpal bone, upon which might be divided all the structures forming the anterior wall of the articular fossa. Thus the "button-hole" slit would be extended at least by half an inch in the most advantageous direction, and should reduction be still impossible the structures lying to the outer side of the head of the bone might be divided, and, if still more freedom be desired, the subcutaneous incision could be converted into an open wound, when the internal boundary of the "button-hole" could be reached from the most advantageous aspect. A hook or lever might be applied to the metacarpal head, and retractors also would aid the readjustment. A loop of wire passed through the "button-hole" should make direct traction backwards on the metacarpal head, while separating the lateral margins of the aperture.—*Dublin Journal of Medical Science, May* 1883, *p.* 385.

29.—FRACTURE OF THE PATELLA TREATED BY SUTURE.

Cases under the care of Mr. Wheelhouse, Mr. Jessop, and Mr. Teale, at the Leeds General Infirmary.

[The following are valuable illustrations of what can be done with impunity in joint-cases. They were treated in the Leeds General Infirmary within a period of ten months, and are reported by Mr. E. Ward, M.A., house-surgeon.]

Occurring within a limited time, such a series is obviously of more value than would be the publication of isolated cases. In the meagreness of published statistics, they may be of some practical value by affording an additional illustration of the satisfactory results obtainable by the adoption of the Listerian method. Salicylic silk was used for all the dressings, and it completely justified the reliance upon it as a convenient, comfortable, and safe antiseptic material. One of its peculiar advantages was well shown in Case 5, where, owing to the permanence of its antiseptic properties, the dressings were left undisturbed for twenty-two days with perfect safety.

Case 1.—*Simple Fracture of Patella.*—Thomas R., a powerful healthy man, aged 29, an itinerant umbrella-mender, was admitted under the care of Mr. Wheelhouse on the 7th July, 1881, with a simple fracture of the left patella, caused by a fall downstairs ten weeks before. He had been treated in two hospitals for periods of five and three weeks respectively; the details of the treatment not being attainable, except that, at the first, the leg was bandaged to a splint, and at the second a plaster-of-Paris case was applied over the knee-joint, with which he could with difficulty drag himself lamely about. This was kept on up to a few days before his admission. During these few days the joint became much swollen, and extremely painful every time he attempted to walk, and he had several times fallen rather heavily. On admission, there was an obvious transverse fracture of the left patella, a little below the centre. There was considerable effusion into the joint, and the fragments were separated about one and a half inches, both being freely movable. Walking was very difficult, as he had to drag the leg slowly and carefully after him, in order to avoid bending the knee, which always immediately gave way when even slightly flexed. The limb was placed upon a back-splint, the knee carefully bandaged, and evaporating lotions applied; but as absolutely no improvement took place during the following month, it was decided to attempt to procure union of the fracture by direct operative interference.

On August 18th, with full antiseptic precautions, Mr. Wheelhouse proceeded to expose the patella by dissecting upwards a large flap. Upon opening the joint, each fragment was found to be covered with a considerable quantity of soft plastic material, but there was absolutely no union between them. This granulation-tissue was removed, and the fractured surfaces were refreshed. Each fragment was then drilled obliquely in three places, by means of an ordinary Archimedean drill. The drill tracks were about three quarters of an inch laterally apart, and passed from the anterior surface, three quarters of an inch from the edge of the fragment, to the face of the fracture close to the articular cartilage, thus avoiding the cavity of the joint. Strong double silver wires were passed through, and an attempt made to draw the fragments into apposition by means of traction on these sutures; but this was found to be impracticable, apparently owing to some permanent structural shortening of the quadriceps extensor, whose tendon was consequently freely divided. The two halves of the patella were brought within half an inch of each other by powerful traction with Malgaigne's hooks. The sutures were then tightened and cut short, and the hooks removed. The wound was closed with wire sutures, and a drainage-tube was placed across the joint beneath the lower fragment. Antiseptic dressings were applied, and the limb was fixed in Dr. P. Heron Watson's plaster-of-Paris apparatus for excision of the knee, with an anterior suspension rod. There was no pain nor subjective disturbance of any kind afterwards. The temperature rose to 101° on the first and third evenings, to 100° on the second and fourth, probably from tension, and never afterwards betrayed any unsteadiness. The wound remained quite aseptic, and healed entirely by first intention, except the two small tracks where the drainage-tubes emerged. It was dressed on the fourth, ninth, and twenty-third days, the drainage-tube and sutures being removed at the first dressing.

As the patient had no fixed abode, and it was thought advisable not to lose sight of him early, he was kept in hospital until October 28th. At this time he could walk well, and flex the knee to a right angle, extension being powerful and complete. Three weeks afterwards he came up for examination, and stated that he had walked ten miles a day without fatigue or distress of any kind. He was also seen nearly four months later, when he was pursuing his usual work, involving almost continuous and heavy walking, which he was able to do with perfect ease and comfort.

Case 2.—Compound Fracture of the Patella.—Margaret M., an unmarried healthy Irishwoman, aged 24, was admitted, under the care of Mr. Wheelhouse, shortly before midnight on October 23rd, 1881, and discharged well on December 3rd, 1881. Four hours before admission she had jumped out of a window in the course of a drunken quarrel, and fallen on the stone pavement twelve feet below, alighting on the right knee. She was very drunk when admitted, though it was afterwards ascertained that she was not a woman of regularly intemperate habits. On examination, the right knee-joint was found to be freely laid open by an almost straight and fairly clean wound about three inches in length, passing transversely across the front of the knee, a little below the middle of the patella, which was fractured at this point, the fragments being about half an inch apart. With the exception of one small splinter from the upper fragment, there was no communication. The joint was filled with blood. There were no other injuries. Mr. Wheelhouse saw the patient very shortly afterwards, and decided to treat the wound after Professor Lister's method. At 1 a.m., five hours after the receipt of the injury, the wound was extended for about an inch at each end, the capsule of the joint being freely divided, in order to expose the cavity more fully and easily. The contained coagulum was then removed, and the joint syringed out with a 5 per cent. solution of carbolic acid, the edges of the wound and the surrounding integument being carefully purified. The knee was then fully flexed, and the joint subjected to a prolonged irrigation with a slightly weaker solution. The fragments were then drilled obliquely in two places, in the manner before described. Strong double silver wires were used, and the two halves of the patella were easily drawn into firm and accurate apposition, the sutures being cut short. The superficial wound was closed with silver sutures, and no drainage was employed, either for this wound or for the joint. The whole of the operation was conducted under the carbolic spray, and complete antiseptics were adopted in the dressing. The limb was fixed in extension upon an ordinary back-splint, reaching to the fold of the nates.

The subsequent history of the case may be shortly summarised. There was never the slightest pain or discomfort in the joint at any time. On the fourth day, the dressing was changed, the joint looking, perhaps, a little fuller than its fellow, but there was no trace of inflammatory change, and the wound was quite aseptic. The deep dressing was slightly stained with the first oozing. The dressing was renewed on the tenth day, and all the superficial sutures were removed. The wound was uncovered again on the nineteenth day, and found to be quite healed. The dressing was discontinued.

The highest temperature observed was 100°. On the twenty-fifth day, she was allowed to get up, and, on the thirty-fourth, the splint was removed. After this time, she was allowed to walk freely about, and was discharged exactly six weeks from the date of admission. Three days afterwards, she walked up to the out-patient room, a distance of three-fourths of a mile; and a month afterwards, when the case was shown at a meeting of the Leeds and West Riding Medical and Chirurgical Society, she could flex the knee beyond a right angle, and stated that it was practically as sound and as strong as the other. She was also seen in the following July, having remained perfectly well, the patella being apparently in one firm solid piece.

Case 3.—Compound Fracture of Patella.—Robert L., aged 17, a labourer, was admitted under Mr. Jessop's care on November 2nd, 1881, and discharged well on January 14th, 1882. About 3.30 a.m. on the day of admission, he slipped off a plank in the dark, and fell into a quarry, alighting on a steel rail with his right knee, which was bent at the time. He was entirely unable to rise, and lay for some time in the mud before help arrived. He was then placed in an open shed, and allowed to remain for several hours before being brought to the hospital, where he was not seen by Mr. Jessop until 2 p.m., nearly eleven hours after the accident; the wound being all this time filled with sand and mud. He was suffering severely from the shock and exhaustion of the injury and prolonged exposure. He was found to have sustained a compound, slightly comminuted transverse fracture of the patella, the fragments being separated about half an inch. There was a severely contused wound about two and half inches in length across the front of the knee, a considerable quantity of mud and gut being ground into the edges. The joint was distended with blood and dirt.

The patient was placed under ether, and the edges of the wound and the surrounding skin were purified as carefully as possible with 1 in 20 carbolic lotion. Under strict antiseptic precautions, the wound was extended about three-quarters of an inch outwards, and coagula were removed with the finger. The knee was then flexed, and the joint irrigated for nearly an hour with tepid carbolic lotion. An incision was made upon the projecting point of a director at the most dependent part of each side of the joint, and drainage-tubes were passed through. Each fragment was drilled obliquely with a small ordinary gimlet, avoiding the articular cartilage; and, a piece of strong silver wire having been passed along the tracks, the fragments were tied firmly together. Only one suture was used, and the ends were left of sufficient length to project from the external wound, which was brought together with wire sutures, dressed antiseptically, and the limb placed in extension upon a back-splint.

During the first nine days there was considerable disturbance, both local and general, the temperature-curve remaining constantly at 101° and 102°. The wound was dressed on the third day. The joint was very red, tender and swollen. The discharge was distinctly purulent, but apparently sweet. The edges of the wound were suppurating freely. It was dressed again on the fourth day. The condition was much the same. After the sixth day, daily dressings were applied until the twenty-third day, after which the dressings were changed every fifth or sixth day, there being twenty-six dressings in all. On the eighth day, the discharge, which was at this time copious, had a distinctly sour smell, but there was no putrefactive odour, either then or at any time afterwards. From this date he steadily improved. On the tenth day, the temperature fell to 100° at night, and remained so till the twenty-fourth day, when it fell to normal, and never afterwards rose. On the seventeenth day the discharge was free from smell, and much reduced in quantity. After the tenth day, the patient, a boy of remarkably phlegmatic temperament, expressed himself as feeling perfectly well. On December 8th, thirty-six days from the date of injury, Mr. Jessop removed the wire suture from the bone. Dec. 19. The wound was quite healed. The dressings were discontinued. Dec. 25. He was allowed to get up. January 2nd, 1882. The splint was removed, and joint found to be fixed: but, on flexing it with a little force, the adhesions were felt to give way. Passive motion was practised daily, and on January 14th he was discharged well. Feb. 8. He showed himself. He had walked on the limb since his discharge, and could flex the knee to a right angle. This patient was seen in July following. At that time the patella remained firmly consolidated, the movements of the joint were absolutely perfect. There was no trace of limp, and he stated that it was quite as sound as the other.

Case 4.—*Simple Fracture of Patella.*—James G., aged 22, a bargeman, was admitted under the care of Mr. Teale on Jan. 30th, 1882, and discharged on April 29th, 1882. He gave the following account of his accident. Seven weeks before his admission, he was thrown violently from his horse, and alighted with the right knee fully flexed against the paved edge of the canal embankment. With a little assistance, he was able to walk home, a distance of about 200 yards. The joint was much swollen, but he had very little pain. He was seen by a medical man, who instructed him to lie in bed, although he did not apparently diagnose the nature of the injury at that time. The patient, however, got up on the following day, and had been able to walk more or less every day since his accident, but with a dragging, awkward, helpless gait, and only by taking thought for every step. Twice, when off his guard, he had fallen heavily.

On admission, the joint was much enlarged, the natural outlines being entirely lost. Examination revealed a transverse fracture of the patella, below the junction of the middle and lower thirds, the fragments being obviously of very unequal size. The enlargement of the joint was apparently mainly due to fluid, with some indefinite thickening about the fractured surfaces. Two fingers could be placed in the gap, and there was no attempt at union of any kind. There was no pain nor tenderness. He could walk slowly and clumsily with care, but after very slight flexion he entirely lost the power of extension, and immediately fell.

Feb. 8. At 10 a.m., Mr. Teale laid open the knee-joint by a transverse incision, about four inches in length, midway between the fragments, which were found to be embedded in considerable masses of soft fibrous substance; this, however, did not completely fill the space between them, and they were consequently quite unconnected by any bond of reparative material. This soft plastic material was removed, and after the fragments had been more fully exposed by a little dissection, a thin slice of bone was sawn off each. The upper fragment was then drilled obliquely in three places in the usual manner. The lower was so small that it was found necessary to pass the sutures through the ligamentum patellæ into the cavity of the joint. It required considerable force, applied by means of Malgaigne's hooks, to bring the pieces into close apposition, but this was eventually satisfactorily accomplished. The sutures were then tightened, and left of a sufficient length for convenient removal. The incisions in the lateral aponeuroses were brought together with three catgut sutures on each side, and a short drainage-tube was passed into the joint on each side through the extremity of the incision. The superficial wound was closed with silver and catgut sutures. The whole of the operation was done with full antiseptic precautions, and an ordinary back-splint was applied.

At 7 o'clock in the evening, the temperature had risen to 101°, and he had considerable pain, both being probably due to the great tension required to hold the fragments in contact. On the following morning, as the temperature had only fallen to 100.5°, and there was still considerable pain, the dressing was changed. Everything was looking perfectly quiet and quite aseptic. The pain gradually decreased, and had quite disappeared on the 12th, when the wound was again dressed for the purpose of removing the drainage-tubes and the superficial wire sutures. Feb. 16. The dressing was renewed. The wound was quite healed, except a tiny button of granulation at the point of emergence of the outer drainage-tube. The knots of the catgut sutures came away on the dressing. Feb. 24. The wound was dressed. The above-mentioned point was still unhealed. The dressings were changed again on March 7th and March 17th; on the latter occasion, the deep sutures being removed. The fragments were apparently firmly and closely united. The patella was freely movable on the femur. March 24. The dressings were discontinued.

As the patient had no fixed abode, and it was doubtful whether, under other circumstances, his further progress could be watched, he was kept in hospital until April 29th, when the only disability remaining was a slight impairment of the power of complete flexion, and some feeling of weakness and stiffness after walking for a considerable time. He has not since been heard of.—*British Medical Journal, June* 9, 1883, *p.* 1118.

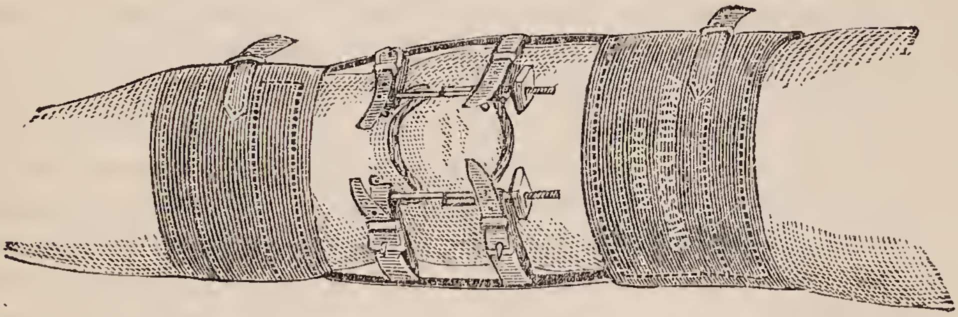
30.—CASE OF RE-FRACTURE OF THE PATELLA.

By Henry Parson, M.R.C.S.Eng., Assistant Medical Officer, Surrey County Hospital, Guildford.

Perhaps the following particulars of a case of re-fracture of the patella, together with a description of the appliances used during the treatment, may be of interest.

In December 1874, Mr. —— fractured his left patella at the junction of the upper and middle thirds. In October 1880, he fractured the same bone at the junction of the middle and lower thirds; and, in August 1882, he re-fractured the left patella at the seat of the last injury—viz., at the junction of the middle and lower thirds. This last accident occurred on August 6th, whilst staying at Amsterdam. He was seen by a local surgeon, who applied suitable splints; and the patient started for England on August 8th, reaching his home on the 9th. I was called in on the 11th, and found considerable swelling over the joint, with about three-fourths of an inch of separation between the fragments. The amount of separation which existed directly after the accident, I could not ascertain. The lower fragment was small, and very movable. He was wearing a leather splint, with side supports, to which were strapped two semilunar soft leather pads. By drawing the pads together, and fastening them, I got the fragments into close apposition; and the patient continued to wear this contrivance until the primary inflammation had subsided.

I then devised the appliance, of which an illustration is here given. It consists of two semilunar pieces, made of some sound, narrow, unyielding material, shaped to fit the edges of the lower and upper fragments. One piece slides on the other, and admits of closing and separating them by means of screws, and without any other movement: so that, when adjusted and firmly strapped to the side supports of a suitable splint prepared for it, the upper and lower pieces are perfectly rigid, one with the other; it is then almost impossible for the patella to slip out of position. The semilunar pieces being narrow, they form grooves for themselves behind the fragments, and have a tendency to run under the bone, instead of over-riding, as most other appliances do; so that the pieces are kept firmly in good



position, in their proper place, and have no tendency to tilting. This apparatus was applied about the end of the third week from the date of the accident, and the patient was removed to the couch.

At the end of the fourth week, he came down stairs with assistance, and went out in a Bath chair. At the fifth week, he walked round the garden with the aid of sticks. At the seventh week, he walked a mile with one stick. At the end of the eighth week, he returned to business, walking to and fro—that is, two miles daily. He could walk well wearing the appliance, and experienced very little inconvenience; and, to the best of my knowledge, the fragments never slipped once during the twenty weeks that he wore the splint. The pressure was relieved at times by small tufts of cotton-wool, and by wearing an old splint at night; but, during the latter part of the time, nothing was worn at night—thus, abrasions from continued pressure were avoided entirely. The patient now walks well, and is not particular as to distance; but still wears a contrivance to support the knee-cap, and limit the movements of the joint.

The advantages claimed for the appliance are these. 1. As soon as the primary inflammation has subsided, and the apparatus firmly and properly adjusted, the patient can begin to move about, and in a short time follow his usual business pursuits. 2. The long confinement to bed is avoided; thus the patient retains his health and strength: and the condition is more favourable to the repair of tissues. 3. Easy adjustment of fragments, and the keeping of them in good position, without fear of slipping when the patient is walking. 4. The slight movement of knee in walking about prevents a stiff joint. and keeps up sufficient activity in the parts to complete the union. Lastly, but not least, as far as the patient is concerned, the "doctor's bill" is reduced, as he will require much less attention.

I consider the case here mentioned to be a good test case for trying the merits of the invention; for, if the surgeon can secure a good union in a re-fracture, and under such adverse circumstances, surely the results will be far superior in the case of primary fracture.—*British Medical Journal, July* 7, 1883, *p*. 11.

31.—ON KNEE-HÆMARTHROSIS AND ITS TREATMENT.

By John Fagan, F.R.C.S.I., Surgeon and Lecturer on Clinical Surgery to the Belfast Royal Hospital.

[Mr. Fagan draws our attention to his treatment of effusion of blood into joints from injury, and details several interesting cases.]

The first case occurred about five years ago, and was unique in all the circumstances attending it. I witnessed from my dining-room window the accident that gave rise to it. A young farmer was dashed with great violence against an iron railing opposite my house, while endeavouring to restrain a runaway horse. He was immediately conveyed to the hospital by the police. I happened to be the surgeon on duty at the time, and, anticipating the house-surgeon's summons, arrived at the hospital just as the man was placed in bed, about twenty minutes after the receipt of the accident. He said he was not much hurt, and complained merely of a stiffness in one of his knees. I found his left knee much swollen, and distended with fluid. He had scarcely any pain in it. I asked him if he had ever noticed anything wrong with this knee; he said that he had not; that it was in every way like its fellow, which was quite normal.

Here was a joint rapidly distended with fluid. What was the nature of it? and what was to be done for it? These were the questions that presented themselves to me. It could not be due to an excessive secretion of the synovial fluid; the accident was too recent to produce synovitis, and there was no pain. It was clear, then, that it must be owing to extravasation of blood from ruptured vessels into the synovial membrane. Viewing the case in this light, and seeing a train of possible serious consequences following from its presence there if I had recourse to the usual methods of treatment, I resolved on its immediate removal. By means of the aspirator, I drew off five ounces of pure blood. The swelling at once collapsed. I put on a bandage, placed the limb on a back-splint and applied an ice-bag, gave the patient a brisk cathartic purge, and put him on low diet. Two days afterwards, there being slight swelling, but no pain, I again used the aspirator, and drew off two ounces of a dark-red syrupy fluid. There was no further trouble. In twelve days after receipt of the injury he left the hospital, there being scarcely any perceptible difference between the knees in appearance or in function. I told him to let me know if he ever experienced any pain in his joint. I have not heard from him since.

Prof. Volkmann, a few years ago drew attention to effusion of blood into the knee-joint, and put the following pertinent questions.—1. *Does the blood effused into the injured joint coagulate, or does it not?* 2. *If it do coagulate, when and under what conditions does this coagulation take place?* 3. *When and under what conditions is blood absorbed?*

He does not propose to answer these questions further than by stating facts observed by him in connection with this inquiry. He found the blood fluid when he punctured between the third and eighth days. In a case of transverse fracture of the patella, with much effusion into the joint, three ounces of blood mixed with synovial fluid were removed on the second day. In another case, where there was wide separation of the fragments, all the effused blood was found coagulated on the fifth day.

My experience, gained from all the cases I have yet met with, leads me to the conclusion that in most, if not all, cases of uncomplicated hæmarthrosis, the blood remains fluid in the joint for an indefinite period. I have found it so at intervals varying from half-an-hour to fourteen days after the receipt of the injury. What it is that keeps the blood fluid, I am not prepared to state. Can it be owing to the fact that it is merely transferred from one cavity (the vessels) to another (the synovial sac), the lining membrane of which resembles that of the vessels in its structure, and that the synovial fluid possesses certain properties favourable to sustaining the life of blood?

To the second question of Volkmann I am also unable to reply, further than to make some suggestions based on the observation of certain facts. From the reports of cases bearing on this subject, I find that, where coagulated blood was found in the joint, it was always associated with bad forms of transverse fracture of the patella, or with some such serious injury to the joint as leads to amputation. In one of Volkmann's cases of fractured patella, where he punctured two days after the injury, he got fluid blood, but he does not mention the extent of separation of the fragments. In another case, where he punctured on the fifth day, and found the blood coagulated, he says there was wide separation of the fragments.

I have had a case of fractured patella and one of the lower end of the femur into the joint, and have removed fluid blood from both joints; in the first, four days, in the second, fourteen days after the injury. In both cases, there was scarcely any separation of the fragments.

Now, from these facts, may we not infer that coagulation is associated with serious injury, causing fracture of patella, femur, or tibia, with a wide separation of the fragments, or with an extensive laceration of the synovial membrane, allowing the blood poured out to communicate freely with the tissues outside the sac, and favouring its coagulation by coming into contact with their rough irregular surfaces?

Regarding the third question of Volkmann, when and under what conditions is the blood absorbed, I will not dwell on it further than to say that I think surgeons talk too lightly of the absorption of this fluid. That it does take place in many cases, where after contusions there is synovitis with some extravasation of blood, I am prepared to admit; but when it forms the bulk of the swelling, as in the second form of hæmarthrosis, I do not think it can be so easily got rid of as is generally supposed. The swelling, after a varying period, may be considerably diminished, but does not entirely disappear; and portions of the organic constituents of the blood remain, modifying the synovial structure in such a way that serious mischief may at any time be developed from slight exciting causes.—*British Medical Journal, Sep.* 22, 1883, *p.* 561.

32.—SIMPLE TREATMENT OF CONGENITAL CLUB-FOOT.

By Edmund Owen, F.R.C.S., Surgeon to St. Mary's Hospital.

The common form of congenital club-foot is that in which the heel is raised and the sole twisted inwards. The speculation has been ventured upon that the deformity may be the result of the adaptation of the foot to the restricted accommodation of intra-uterine life. Whether this be so or not is immaterial to the aim of this short communication, in which I shall submit that in many, if not in most, of the cases of congenital talipes equino-varus a permanent shortening of the tendon of Achilles is the head and front of the offending. When this tendon has shortened to the utmost in the elevation of the os calcis it can contract still further by effecting a rotation of the bone upon its antero-posterior axis, the astragalus also participating in the inversion. The natural bowing of the leg and the absence of malleolar projection upon the inner side determine that the secondary distortion of the foot shall be inwards. Probably in the early months of the compound deformity the tibial muscles have but little concern in the matter, though, if the treatment of it be delayed, their tendons have no more chance of undergoing due growth than have the bones and the pedal structures generally, and thus they may eventually require section. My reasons for advancing this view are briefly these:—1. Uncomplicated talipes equinus is by no means of infrequent occurrence as a congenital deformity, whilst simple inversion of the foot without any elevation of the heel is a rarity; and, as talipes varus is commonly associated with equinus, it appears not improbable that the inversion of the foot is but a further development of what would otherwise be an extremely common congenital deformity—talipes equinus. 2. In ordinary equino-varus the tendon of Achilles is displaced well to the inner side of the vertical median plane of the ankle-joint, as if, having expended its energy in raising the heel, it had finally imparted to it a definite inward twist; and this condition is to be made out even when there may be no great amount of contraction of tibial tendons. 3. In many cases of slight equino-varus, when one has been hesitating as to whether or not the tendons lying against the internal malleolus should be divided before that of the calf muscles, and has eventually decided against their divisions, on cutting through the tendons of Achilles all the inversion of the foot has disappeared. 4. A prolonged and intimate acquaintance with the employment of the plaster-of-Paris bandage has shown me that in many instances of the twofold deformity of infants the division of the tendon of Achilles is the only cutting operation required.

If the theoretical parts of the foregoing sentences be deemed unsatisfactory, a total disregard of them will in no way interfere with the excellent working hypothesis with which I venture to associate them. And here I would remark that the "simple treatment" which I am about to describe in no way refers to those varieties of slight deformity which one has been accustomed to see effaced by massage or manipulation, or by the education of a splint of tin; nor. on the other hand, does it refer to those deformities of later childhood in which all the structures concerned have become rigid, misshapen, and displaced.

In the ordinary course of dealing with an infant's foot in which the heel was firmly elevated and the sole faced directly inwards one or more of the tibial tendons would be divided, and after the lapse of a few days the foot would be secured in a Scarpa's shoe, for the correction of the inversion. When this first step in the operation had been accomplished the second would be taken, which consisted in the section of the tendon of Achilles; and when the slight wound in the skin had become securely mended the heel would be gradually brought down by means of the working of a cogwheel at the ankle. Subsequently through weeks or months precautions had to be taken to provide against a relapse. Those who have had much to do with Scarpa's shoes will probably agree in this, that, excellent as they are, they are costly; that in hospital practice at least they are apt to get out of repair; that the little patient has a marvellous knack of getting his small heel from out of the depths of the shoe; that the infant requires almost daily surgical supervision; and that, even when the greatest care is being exercised, the localised pressure of a strap is apt to excite general irritability or distress, and to excoriate the foot. Now, by substituting a properly prepared plaster-of-Paris bandage for the mechanical shoe in many cases the tendon of Achilles only need require division; and about three or four days after the little operation the foot is to be put in a thickish sock which fits it evenly and smoothly. Then, from about the line of the clefts of the toes to a few inches above the ankle, the foot is to be quickly and firmly encased in the wet plaster bandage, and immediately that the last turn is finished the foot is to be forcibly manipulated, so that as the plaster is setting it may be steadily held in a position towards flexion and eversion such as shall give cheering and definite promise of eventual cure. In three minutes or less, when the plaster has hardened, the tip of the sock should be cut off in order that the toes may be exposed to view, for if they by chance were seen swollen or congested the hardened bandage would at once be removed; but if not, the casing might be left on for two or three weeks without being touched. At the end of that time it should be removed by finding the end of and unwinding the bandage. The foot should then be rubbed with oil and again enclosed as before, only as the plaster is hardening this time the position is to be absolutely rectified. In another three or four weeks the foot may be again examined, and then put up a third time in plaster-of-Paris, or fitted with a stiff leather boot, as may be deemed expedient; when the patient lives at a distance the former course is desirable, lest the needful frictions and manipulations being but imperfectly executed a relapse follow.

As a rule the infant suffers but little discomfort after the first few hours; and I am told by those who are in a position to judge that the smooth pressure of the casing does not distress the child even during that short period as much as does occasionally the tightening of the strap of a Scarpa's shoe. Certainly in a long series of cases which have been thus treated, I have never once seen the skin sore or even threatening. The supervision after a few days have passed need entail no trouble either on the part of the surgeon or the mother. At the present moment I have hospital patients who are being thus treated in Buckinghamshire, at Woolwich, and in several other outlying places, and, having arranged that on the slightest suspicion of there being anything going wrong under the bandage I am to see the child, I am able to let the mother attend once a fortnight. In one case there was some suppuration under the skin of the calf, which was in some obscure manner due to the bandage; but the complication soon passed away and merely prolonged the ordinary course of events.

I should say that, as a rule, the plaster bandage has to be reapplied three or four times; probably much of the success attending its employment depends upon attention to the following details:—The bandages should be about two inches wide and two yards long; one and a half or two of them will be necessary. The material of which they are composed should be "cross-wove crinoline muslin," and this should be boiled before it is used in order to free it of the stiffening of size with which it has been "dressed." When it has been dried its meshes can be more easily and thoroughly impregnated with the dry plaster which is to be rubbed over each side and well up to the ends of the bandage. The plaster should be quite fresh, and of that fine quality which dentists use for their maxillary models. A most important point is that the impregnated bandages be loosely rolled, so that immediately they are put into water every molecule of the plaster may be straightway wetted. The roller must be dipped, not soaked, in the water, and should be applied dripping wet, for squeezing it drier in the hand involves the loss of much valuable plaster from its folds or meshes, and perhaps also some slight loss of time. A little common salt should have been dissolved in the water to hasten the setting of the plaster. The whole business occupies about five minutes; and on its conclusion a handful of moist sugar in the wash-hand basin will be found of excellent service in freeing the operator's fingers and nails of the tenaciously adhering plaster.—*Lancet, April* 28, 1883, *p*. 723.

33.—ON A FORM OF LATE RICKETS ASSOCIATED WITH ALBUMINURIA,—RICKETS OF ADOLESCENTS.

By R. Clement Lucas, B.S., F.R.C.S., Sen. Assistant-Surgeon, Guy's Hospital; Surgeon to Evelina Hospital for Sick Children.

My attention has lately been directed to a form of rickets occurring about the age of puberty, the true cause of which I do not think has been hitherto described or discovered. The first case that came under my notice was a pianoforte tuner, seventeen years of age, who consulted me in 1877 for lateral curvature of the spine. The constant elevation of the right arm in his employment had led to great projection of the right shoulder, and the double curve was well marked. His thorax was also distorted in the form known as pigeon-chested. There was some beading of the ribs and enlargement of the wrists. The pallor of the man led me to examine his urine, and I found that it gave a considerable precipitate of albumen on the addition of nitric acid. The true cause of the albuminuria I did not in the least suspect, and I lost sight of him without, I believe, rendering him any great benefit. Dr. Moxon published his paper on chronic intermittent albuminuria in the Guy's Hospital Reports for 1878, and, under the title of Albuminuria of Adolescents, alluded to the cause which, I think, will be found common to both this late rachitic condition which comes under the notice of the surgeon and the albuminuria, which has probably hitherto been more frequently detected by physicians. Since the publication of that paper I have from time to time occasionally detected albuminuria in cases of curved spine and bent bones; but it is only lately that I have learnt definitely that the phenomena of late rickets and albuminuria are too frequently connected to be matters of chance, and that the latter is often an important symptom indicating the cause of the former. The form of rickets which it is the object of this paper to point out, I would suggest, should be called the "rickets of adolescents," so as to associate its etiology with the albuminuria of adolescents pointed out by Dr. Moxon. It is possible that some may take exception to the term rickets as applied to these cases, but I have not the slightest doubt in my own mind that the general condition under consideration is essentially the same as that brought about in early life by defective diet and consequent mal-nutrition—factors which may be regarded as contributing to the rickets of adolescents. Late rickets presents certain differences from the rickets of early life dependent upon the greater maturity of the skeleton, and those who regard the disease as simply a bone affection may be slow to recognise its later manifestations. The enlargement of the epiphyses, as would be expected from their more extensive ossification, is never so great as in early life, and the disease more commonly shows itself first in a yielding of the ligaments rather than in a bending of the bones. The skull, too, which in early life presents under the influence of rachitic health such remarkable and characteristic changes, escapes when ossification is far advanced. A certain amount of enlargement of the epiphyses will, however, be generally observed, and, in severe cases, a considerable degree of bending of the bones. I do not think that it is yet generally recognised how many cases of lateral curvature have their origin in the rickets of early life, which may go on unrecognised till a new depressing influence causes the curvature to become more pronounced. There is still a wide-spread notion that only a general backward curvature results from rickets, whereas the spine may be predisposed by this disease to bend in any direction, and lateral curvature from rickets is not only not rare, but very common among children. Knock-knee and flat-foot are among the more common and earlier signs of the late rachitic condition, because, as I before remarked, the bones and their epiphyses, having become extensively ossified, do not so readily indicate the general change. A large proportion of the cases of lateral curvature in males, commencing about puberty or somewhat later, will come under this category, and in many albumen will be detected in the urine. Whether similar deformities which are frequently met with in growing girls are also associated with albuminuria I am unable to state, as the difficulties in out-patient practice of examining the urine of females are very great; and I have made no observations; but I have long been of opinion that the rachitic state of health which may be observed about the age of puberty is imperfectly accounted for by the temporary indispositions consequent upon the menstrual molimina. The author of the paper to which I have alluded had at the time of writing made no observations on females, and if the albuminuria of adolescents were confined to males, it might be a question how far a mixture of secretions with the urine was the cause: but from the quantity present and the early age at which it is sometimes found, the more probable explanation seems to be that the renal organs lie within the radius of sympathetic irritation.

The following cases of rickets of adolescents have recently come under my notice:—

A boy, aged fifteen years, who was employed in an insurance office, was brought by his mother among my out-patients at Guy's Hospital in January last. He had been ailing in health and growing gradually weaker during the last twelve months. He had complained of pain in the back, weakness of limbs, and general lassitude. Of late he had been unable to run up the steps of the office in which he was employed as errand boy. It was noticed that he was walking on the inner side of his feet, and that his knees bent in. On examination we found that the epiphyses of his ankles were large, and that the arches of his feet had given way. He was also suffering to a slight extent from genu valgum. When his back was stripped we found that he had a quadruple curve in the spine, and there was also slight enlargement of the growing extremities of the ribs. His urine treated with nitric acid gave a large supernatant precipitate of albumen. This boy was cautioned as to his habits, and treated with phosphate of iron and cod-liver oil. In about two months the albumen disappeared, and he had sufficiently improved in health to return to his employment.

At the same time another boy, aged twelve years, came under my care at the Evelina Hospital for Sick Children, suffering in the same way. He had general bending of his spine, causing it to project backwards, his head dropping forward over his chest. There was slight general enlargement of the epiphyses. He was pale and vacant in manner. His mother brought him because his spine had grown out, and he was so weak that he was unable to do anything. He was treated in the same way, and cautioned as to his habits. He became much more upright in a few weeks, and was gradually gaining strength when last seen.

A third case came first among my out-patients at Guy's Hospital on April 12th. He was a lad, aged sixteen years, employed as a plumber, and sought advice on account of genu valgum on the right side, which had been giving way for twelve months. He had pigeon-chest and general enlargement of his epiphyses, but the arches of his feet had not yielded. On testing his urine with nitric acid, we found it contained a considerable quantity of albumen. He had enlarged tonsils and dilated pupils. He admitted his culpability, and was put on the same general treatment as the other cases.

A fourth case came among my out-patients at Guy's Hospital on April 19th. G. W——, aged fifteen, complained that he had suffered from aching pain and weakness of the right ankle for some months. He had spurious valgus of the right foot, with enlargement of the epiphyses of both ankles. His thorax was pigeon-chested, probably from old rickets. On testing his urine with nitric acid, it gave a well-marked precipitate of albumen.

The foregoing observations will indicate the inutility of merely treating deformities by means of splints and apparatus, as if they were but local affections. The rachitic condition of adolescents has usually one cause, which may be generally discovered by testing the urine. The discovery of albuminuria renders it easy for the practitioner to give such advice as may prevent this unhappy class from persisting in habits which would cause their deformities to become permanent.—*Lancet, June* 9, 1883, *p.* 993.

34.—SPINA BIFIDA SUCCESSFULLY TREATED BY INJECTION, AND EXAMINED POST MORTEM.

By Noble Smith, F.R.C.S.Ed., Surgeon to All Saints Children's Hospital; and to the Farringdon Dispensary.

A. W., aged two months, was born with a deficiency of the arches of the lowest lumbar and upper sacral vertebræ. The size of the tumour was in circumference at the base 8½in., from side to side over the tumour 5½in., from above downwards 4½in. The tumour was fully distended, translucent, and presented an ulcerated surface in the centre, secreting fluid. There was no appearance of large nerves in the sac. The right leg was small, deficient in muscular power, and the foot was affected with talipes valgus, but in other respects the child appeared to be healthy. I punctured the tumour with a No. 3 trocar low down upon one side, drew off two ounces of clear, straw-coloured fluid until the tumour was diminished to half its original size, and injected forty minims of Dr. Morton's iodo-glycerine fluid, and closed the opening with collodion and plaster. The constitutional disturbance was severe for twenty-four honrs, after which the tumour began to cicatrise, and gradually shrivelled up and became like a piece of rough puckered leather. The operation was performed upon the 5th of September, 1877, and in twenty-five days the tumour consisted only of rough thickened skin, which was slightly protuberant from the surrounding surface. A part of the wall of the sac the size of a shilling remained there, and apparently unaffected by the injection. This could doubtless have been destroyed by a second injection, but the mother refused to allow another operation because her child had seemed to suffer so much from the first one. The treatment was so far perfectly successful, and I anticipated a satisfactory progress of the case, although I should have preferred completing the transformation of the wall of the tumour.

In February, 1878, nearly six months after the operation, hydrocephalus made its appearance, and ran its course in two years, at the end of which time the child died. I was permitted to make a post-mortem examination of the spina bifida. Externally the remains of the tumour appeared as thickened and puckered skin, and resistant to the touch. At the centre was situated a small patch, less than the size of a shilling, of thinner skin, beneath which could be felt a small cavity. Upon dissection the remnant of the tumour was found to consist of very dense fibrous cicatricial tissue, in the form of fibres and bands passing in all directions, and closely united together. The deficiency in the wall of the spinal canal was blocked up by this cicatricial material, but with difficulty a very small probe could be passed along a tortuous passage leading from the small cavity, already referred to, to the canal. There can be no doubt that a second injection would have completely obliterated this small cavity and its connexion with the canal, and have rendered the tumour more thoroughly solid. The cicatricial tissue did not extend beyond the opening into the canal, but it formed a remarkably firm wall in place of the deficiency of bone. I could not discover any nerves passing from the canal to the wall of the sac.

The result of this examination seems to me of value, as supplying a proof that an efficient closure of the deficiency in the vertebræ can be effected without encroachment upon the spinal canal.—*Lancet, August* 4, 1883, *p.* 183.

ORGANS OF CIRCULATION.

35.—THE CATGUT LIGATURE IN POPLITEAL ANEURISM.

By Warrington Haward, F.R.C.S., Surgeon to St. George's Hospital, London.

The following case, bearing upon the behaviour of the catgut ligature as applied to large arteries in their continuity, is worth recording:—

R.N., aged 57, a butler, was admitted into St. George's Hospital, under my care, on July 8th, 1882, with an aneurism of about the size of a cricket-ball in the left popliteal space.

The tumour had the characteristic expansile pulsation, which was felt most forcibly on the inner side, where also it was most prominent. It could be moved on the bone; and its pulsation stopped when pressure was made upon the femoral artery in the groin. A loud bruit was audible over the tumour. The leg was swollen and the skin œdematous. The man was of tolerably healthy appearance, excepting that the capillaries of his face were somewhat dilated. His hair was grey, his pulse rather weak, and he had a slight cough. His urine was natural; so were the heart sounds. He stated that his father had died of heart disease. He himself had been in good health until the last two years, during which he had been subject to cough. He had never had syphilis, and had never been intemperate. Six weeks before admission he felt a pain in the left knee, which was persistent; but he noticed no swelling till a month had elapsed, and then he observed an oblong pulsating swelling behind the knee. He continued, however, to walk about for another week, when the pain became so severe that he took to his bed; he had therefore been resting in bed for a week before admission, during which time the tumour was still increasing.

The limb was raised, and for ten days the leg was kept in the flexed position. For the first few days the pulsation diminished, but it was then noticed that the tumour was increasing towards the inner side. It was therefore determined to ligature the femoral artery without further delay.

On July 20th the artery was tied in Scarpa's triangle with a carbolised catgut ligature prepared with chromic acid, in the manner recommended by Mr. Lister. Antiseptic precautions were observed, but no spray used. The ligature was cut short, a small drainage-tube inserted in the wound, and the incision closed with a continuous suture of carbolised silk. The dressing consisted of a pad of salicylated wool enclosed in eucalyptus gauze.—22d: The wound had healed excepting where the drainage-tube projected. The tube and stitches were removed, and a strip of plaster was placed across the wound. There was slight pulsation to be felt in the tumour.—25th: No pulsation felt in the aneurism. No fever or constitutional disturbance ensued upon the operation; the aneurism consolidated, and, with the exception of a little cough, he was quite comfortable on Aug. 9th. He was dressed and lay outside his bed. The aneurism continued to diminish, and his condition seemed satisfactory until Aug. 19th, when in the night he became suddenly delirious; the delirium was succeeded by drowsiness, and subsequently by coma, in which condition he died on the 22nd, a month and two days after the operation.

Permission could only be obtained to examine the limb, but this gave us the opportunity of ascertaining the condition of the ligature thirty-three days after its application. A careful dissection of the aneurism and its afferent and efferent vessels was made by Mr. Ross, the curator of the museum, with the following result:—The femoral artery was filled by a firm decolourised clot, which extended from the seat of the ligature to the origin of the profunda, about an inch below Poupart's ligament. The remainder of the artery below the ligature, as well as the popliteal almost to its division, was also filled with a firm partially decolourised clot. The lower part of the popliteal artery presented a fusiform dilatation of about the size of the last joint of the thumb. From the upper part of the vessel projected a globular aneurism, the size of one's fist, which communicated with the artery by an opening about three quarters of an inch in diameter. The sac was formed by the outer wall of the vessel and was filled with laminated clot, the outer layers of which were decolorised. The catgut ligature appeared unchanged; it surrounded the artery, being embedded between the outer coat of the vessel and a thin layer of fibrillated lymph. The knot was firm. The two inner coats of the vessel were divided at the seat of ligature; they were curled inwards, and were united where in apposition. The external coat of the artery where surrounded by the ligature was intact. The examination showed, therefore, that the chromicised catgut ligature, thirty-three days after its application, remained firmly around the artery in a perfectly harmless condition. There was no sign of irritation in the surrounding tissues, which were soundly healed.

The cause of death I suppose to have been cerebral hemorrhage; but this was clearly quite unconnected with the operation, from which the man had completely recovered.—*Lancet, June* 16, 1883, *p.* 1037.

36.—ON THE TREATMENT OF NÆVUS.

By Wm. Martin Coates, F.R.C.S.Eng., Senior Surgeon to the Salisbury Infirmary.

Having, for many years, given some attention to the cure of the different kinds of nævus, I take this opportunity of making known my experience, especially as I think that I have something new to say.

The treatment of superficial venous nævi, found by me to be painless, safe, scarless, and certain, but little known, or, to speak more correctly, almost forgotten, was worked out by the late Dr. Marshall Hall. His object was to excite just so much increased action in the growth as to cause deposition of lymph and occlusion of its vessels. He, for this purpose, introduced a cataract-needle at about a line from the circumference of the nævus, and passed it from the point of its entrance to the opposite extreme edge of the growth, keeping it in all its course as near as possible to the surface. The needle was then withdrawn almost to its point of entrance, and pushed again through the nævus at about the sixteenth of an inch from the line of the first puncture, and so on until the lines of puncture took a fan-like shape. It is desirable to keep the needle as close as possible to the surface, though should it penetrate the thin covering of the growth, a piece of adhesive plaister arrests the bleeding immediately.

There is no need of breaking up the structure of the nævus, as has been recommended. The way in which nature perfects the cure is very beautiful. A small white spot soon makes its appearance in the centre of the growth; this gradually spreads, and there is left in a few months a spot perfectly smooth, and whiter than the surrounding skin. A few months should be allowed to pass before following Dr. Marshall Hall's advice to puncture again, as I have never found it necessary. One operation has invariably succeeded in the superficial venous nævus. My first case was a boy aged two years, an out-patient at the Salisbury Infirmary. He had a superficial blue nævus, of the size of half a crown, on the left side of his chest. I operated as above described. He did not come again. A year afterwards, I got his address, and paid him a visit. The nævus had entirely disappeared, leaving in its stead a spot smooth and whiter than the surrounding skin.

Now that we have safe anæsthesia, there need be no pain in the treatment of such cases.

To Dr. Marshall Hall belongs undoubtedly the merit of the discovery and perfecting of this philosophical and successful treatment. It is, it seems to me, a beautiful instance in which, as in congenital cataract and talipes, Nature awaits the beneficent interference of the surgeon, and then does her part perfectly.

The bright scarlet or arterial nævus, whether it appears as a small bright spot, or as a patch measuring one or two inches in diameter, or, again, as one or two minute arterial branches, requires a more pronounced treatment, based however, on the same principle—stimulation, not destruction of tissue.

My first case of minute arterial nævus occurred in a young bride. It was on the left side of her nose. It was, she said, increasing. Nitric acid would have left a pit. I made a puncture into the bright spot with a bleeding-lancet, and then passed into the small incision a point of nitrate of silver, holding it there for a few seconds; this we all know is a stimulant, not a caustic. This cured the nævus, leaving no scar. The needle would have been useless in such a case. When there are several minute arteries radiating just beneath the cuticle, nothing but destruction by nitric acid, or tying the part, both of which leave scars, or the following little operation—which, as the next case will illustrate, was discovered by a lucky accident—has succeeded in my hands.

A young lady, aged 15, was anxious to be present at her sister's wedding, which was to take place in three weeks. She had observed a red spot on her left cheek. On examination, there were at this part several minute vessels, which divided into several branches. I had in other cases tried to deal with them by cutting through subcutaneously each trunk and branch by a cataract-needle having sharp edges, but failed.

Nitric acid was undesirable, as was tying, from the attendant pain and inevitable cicatrix. I determined to try the needle again, as, at the worst, it could do no harm. On taking it out from its case, I was momentarily annoyed to find its point broken off; but, after a moment's reflection, I saw how this might be turned to good account. I determined to proceed. I entered the broken needle at a line from the nearest branch, but with the flat of the needle at right angles to the skin, and pushing it steadily forward, tore through each vessel and branch in several directions. The next morning, a bluish spot had taken the place of the red one, produced evidently by an ecchymosis. This was absorbed in a week, and the case was cured. The cure was permanent, as five years have elapsed, and no sign of the deformity exists.

I have applied this treatment in one similar case since. The spot of enlarged vessels appeared behind the left ear of a little boy, aged two years. It was growing. For this case I had had made, by Weiss and Son, a large needle with a blunt flat end. Under anæsthesia, I, with this instrument, passed, as in the last described case, with the flat end at right angles to the skin, tore through the vessels. Again an ecchymosis took place. This was soon absorbed, and the red spot disappeared, and is now not to be seen.

I have since then applied this treatment in the broad superficial arterial nævi, with invariable success; but they require the proceeding to be repeated two, three, or four times, at intervals of three or six months. In these cases, numerous white spots occur over the whole nævus after a few weeks. These, spreading slowly, join together; and, in a space of time varying from six months to two years, the nævus has disappeared, leaving in its place a portion of white skin, but neither scar nor depression. Large nævi claimed my attention more than twenty years ago, excited by a desire to save little children especially from the agony felt by them for many hours after strangulation or ligature, or destroying the growth by nitric acid, and from the danger of the injection of perchloride of iron.

When a nævus, venous or arterial, exceeds a thickness of one-sixteenth part of an inch, the needle-operation is not applicable. Having failed with it in one or two cases, I looked out for a more effective treatment for what I shall call thick nævus.

During my investigation of the treatment of bronchocele, cold abscess, and hypertrophied glands, I was struck by the power of hardening, contraction, and subsequent absorption possessed by hypodermic injections of undiluted tincture of iodine, and made up my mind to try it in the first case of thick nævus that presented itself. The following case gave me the opportunity.

A. E., aged one year, became an in-patient at the Salisbury Infirmary in the year 1861. This little girl had a venous nævus, of the size of a large walnut, situated on the left eyebrow, from which it hung down, completely obstructing vision in the corresponding eye. When admitted, there was a thread seton which had been passed through the centre of the tumour. The patient's mother stated that there had been no improvement. I was induced to try a treatment recommended at that time by some surgeons. It consisted in making several punctures by a small hot iron. These produced little pits in the skin, but no improvement followed. I then threw into the midst of the nævus, hypodermically, half a drachm of undiluted tincture of iodine. Hardening was the immediate result. This was repeated every month. The nævus soon began to lose its colour and to slowly shrink. In twelve months it no longer obstructed vision. I then lost sight of the patient. As she lived only seven miles from Salisbury, I visited her in 1869, and found that the nævus had entirely disappeared; but the seton and hot iron had left pits which will, of course, last during her life.

Since 1861 I have treated all nævi projecting more than a sixteenth part of an inch from the surface in this manner.

The little operation is very simple. Wood's syringe, with a very fine needle, is the only instrument required. Sufficient tincture of iodine having been drawn into the syringe to fill the nævus, the needle is introduced through the skin at about a line from the circumference of the nævus, and passed to its centre. The piston is propelled slowly home, so as to force the tincture into every part of the growth. This is facilitated by moving the point of the needle into every part of the nævus. On withdrawing the instrument, pressure is made on the small puncture for a few seconds, and the proceeding is complete.

I have practised this treatment many times since the year 1861, with complete success. One injection generally succeeds, sometimes several are required. Usually a slight vesication occurs on the surface of the nævus, then a white spot or spots appear, which spread in all directions until the vessels are obliterated; a slight depression of the surface alone remains. In two cases the action was more violent and more rapidly curative.

In a little boy who had a small thick nævus in the inside of the upper lip, five minims induced sloughing of the growth, which shelled out, leaving a fine cicatrix. In a little girl, a nævus of the size of a filbert, situated in the left labium, sloughed and shelled out in a similar manner. In these two cases, the abnormal structures could not bear even the gentle stimulus of the tincture of iodine, and so lost their vitality.

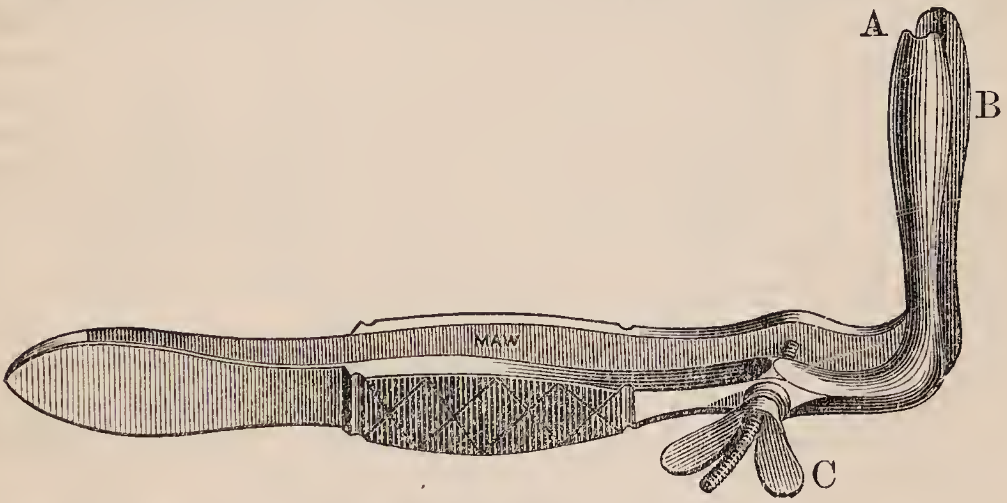
I am quite aware that the treatments of nævus that I have ventured to bring forward are not heroic. This, by some, might be thought an objection, but to medical practitioners, whose lives are spent in the relief of pain and the saving of life, the bloodlessness, painlessness, and freedom from danger of these proceedings will be an additional recommendation. If by this paper some sensitive patients be saved from the torture of the ligature, the pain and scars of nitric acid, and the danger of the injection of the perchloride of iron, my object will have been attained, and I shall be amply rewarded. This is my ambition, and it is not a trifling one; for it aims at no less an object than the abolishing several time-honoured proceedings in favour of a system by which they will be rendered unnecessary, and much pain and some danger of life avoided.—*British Medical Journal, Aug.* 18, 1883, *p.* 318.

ALIMENTARY CANAL.

37.—ON THE OPERATIVE TREATMENT OF HARE-LIP.

By James Whitson, M.D., F.F.P. and S.G., F.R.M.S.; Surgeon to the Dispensary of Anderson's College, Glasgow.

Our first duty, before proceeding to operate in a case of hare-lip, is to envelop the child in a large towel, in order to prevent any movement of the arms. This having been accomplished, we next proceed to free the lip from the gums, the thorough performance of which is of the utmost consequence, and should be carefully attended to, in order that the apposing surfaces may come easily together. In doing this I would recommend the use of a small knife. It is quite as effectual as a larger one, and adapts itself more readily to the hand, as well as to the confined and cramped area in which we are here compelled to work. The edge of the blade should be directed towards the upper maxilla, and away from the lip itself. In this way the greatest amount of tissue is conceded to the latter, so that its thickness and consequent vascularity are unimpaired, while hemorrhage is, by conformity to this rule, almost *nil.* If there be any projection of the intermaxillary bones which it is impossible to utilize, it must be removed; but for the patient's sake it is advisable to take away as little as is compatible with the satisfactory reduction of the malar displacement. Few speak more forcibly on this point than the late Dr. Maurice Collis, of Dublin. Doubtless it is comparatively easy to snip off any undue prominence in connection with the upper jaw, but it is well to remember that by so doing we deprive the soft parts, to a greater or lesser extent, of their natural support, that empty spaces are not easily filled, and that teeth once sacrificed can never be replaced. A little time and pains, as well as conservative skill, may therefore be ungrudgingly bestowed here, not only for the credit of the profession, but for the patient's future comfort and improved powers of articulation. In some instances the dislocated portions may be forced into favourable position and wired together. When this can be done, it is well to carry it into practice. The younger the child the more easily will it be managed—a convincing argument for the adoption of early remedial measures.



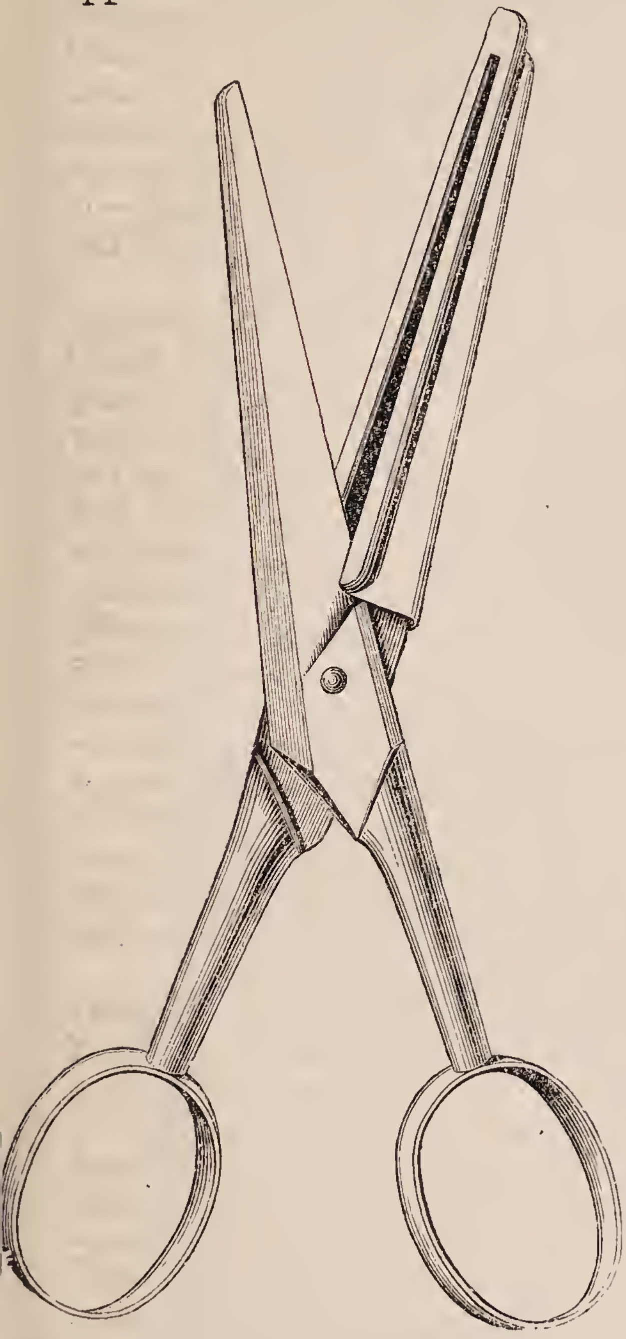
Dr. Whitson's Hare-lip Clamps.

What may be called the third and most important step in the operation is the cutting of the flaps; but before attempting their scission it is a good plan to apply a suitable pair of clamps for the prevention of hemorrhage during this stage and throughout the subsequent process of suturing the newly freshened surfaces. I show you one or two specimens of these, and you can judge for yourselves which are the best to work with. Mr. Thomas Smith, of St. Bartholomew's and the Children's Hospitals, gives a sketch of a pair in an old number of the Lancet, but they appear to have two defects. The first is that they exercise far more pressure than is requisite for the complete command of the coronary vessels, with no means of graduating it; and the second is that from their shape they interfere with the free play of the surgeon's hand. Another pair are too heavy, and are apt to be a hindrance from their bulk. Here are a pair of clamps which Messrs. Maw, Sons, and Thompson, of 7, Aldersgate Street, London, made for me last year. I have found them, from repeated trials, to be admirably adapted for attaining the end we have in view (*see woodcut*). They are light and handy, while, owing to their construction, they are, when in use, completely out of the way, and do not impede the operator in the slightest. No more compression than is absolutely necessary—a principle of cardinal importance—is applied by means of the screw (C) through the medium of the blades (A and B).

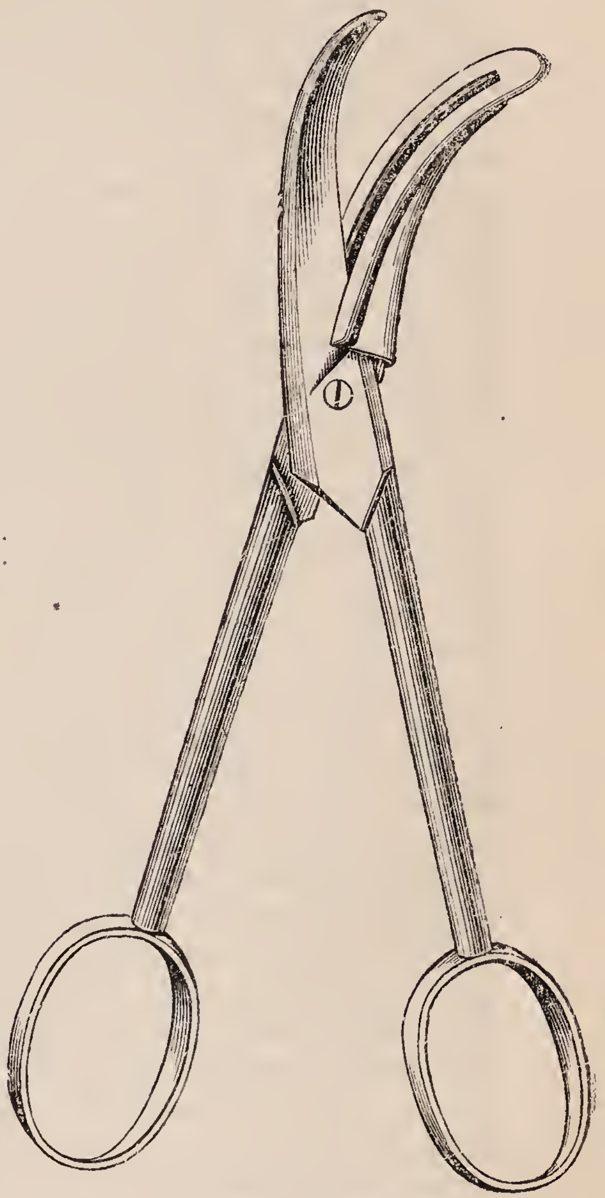
In order to facilitate the proper performance of flap section, you will find it advisable (the clamps being accurately fixed) to make use of two pairs of fine artery forceps, one being placed at the nasal, while the other grasps the lower extremity of the fissure. In this way the labia can be put lightly on the stretch, which renders the requisite incising easier, cleaner, and neater. It is the general custom to pare the edges with a knife; but there are many, including Dr. Wheeler, Mr. Butcher, and M. Malgaigne, who advocate the use of scissors specially devised for the purpose, and who claim for these a superiority over other instruments. Certainly the results of Dr. Wheeler's cases, as shown in his paper, are excellent, and to all appearance the end amply justifies the means. His scissors are of two kinds, straight and curved, the latter being beautifully designed for the execution of a concave incision. By his permission I am enabled to give woodcuts of both. The curved are made for both sides. The specimen shown is for the right side of the cleft.

Mr. Thomas Smith speaks highly of scissors, and suggests that, before denuding the edges, the centre of each margin of the cleft should be forcibly drawn out by means of a pair of artery forceps, with the view of imparting a concave aspect, (); but the curved scissors of Dr. Wheeler effect this without straining or pulling on the labia—always an undesirable object at this juncture, because of our inability, under such circumstances, to gauge accurately the amount of tissue to be removed. If you use a knife, a sharp tenotomy one is as good as any. It should be made to transfix the entire thickness of the lip close to the nose, and be carried gradually downward as far as is considered necessary, when it can be reversed, and, if so wished, the flap disconnected on its upper aspect. In the performance of this, gentlemen, I cannot too strongly inculcate on you the necessity of removing a good slice of tissue, and avoiding the mistake, which nearly all beginners make, of timidly running the knife down by the junction of the red margin.

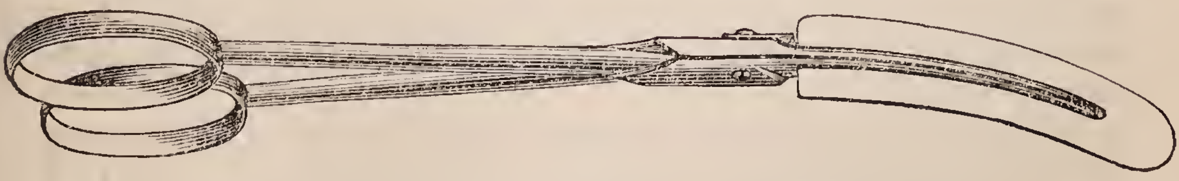
We will now suppose the flaps cut and ready for allocation to their respective sites. The next question, therefore, comes to be, What kind of suture shall we call into requisition for the approximation of the recently pruned edges? The metallic,



Dr. Wheeler's Straight Hare-lip Scissors.



Curved Do. (open).

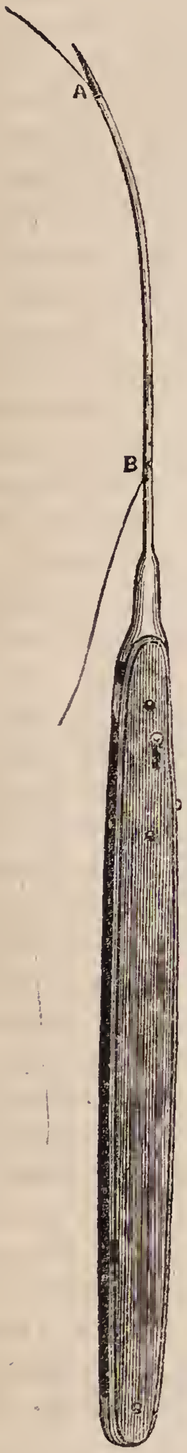


Curved Do. (closed, showing concavity).

consisting for the major part of silver wire, chromicised catgut, horse-hair, silk, the bead or quilled, and the hare-lip needle, have all been tried and advocated. I would advise you to give a preference to either of the first two. Silver wire, though not without drawbacks, makes an excellent suture, and a tolerably thick thread should be selected. It is less liable to cut when not too fine, it fulfils its mission better, and forms a fast knot, the ends of which should be laid flat in order to lessen their chance of catching. Chromicised catgut acts beautifully and needs no further care. It possesses an inherent adaptability which wire, however ductile, can never acquire. Horse-hair, though by no means destitute of advantages, is not to be specially lauded. Owing to its fineness, it is somewhat prone to cut if subjected to any strain; the pliancy of gut is awanting, and, unless care be taken in its ligation, it is almost certain to be laxly done and thus slip. On the other hand, no stitch is more easily withdrawn, and, unless forced by tension to eat its way towards the exterior, little trace of its presence can be afterwards seen. I have found silk best suited for approximating the prolabium, and in this capacity you will find it handier than hair. The needles were at one time universally approved of, but they have to a great extent been discarded by most surgeons. They leave a mark necessarily enlarged by tension and in proportion to the length of time they are allowed to remain *in situ*. The compression exercised by them is apt to trespass upon the vitality of the neighbouring parts, while the thread which is wound round them conceals the lips, becoming, when soaked with blood, a stiff and unyielding mass.

Should you be forced in an emergency to try the needles, you will find it convenient, after having placed them in position, to appose the raw surfaces before putting on the silk: and the latter ought to be of a coarse kind in order to spread the area of pressure and minimize ulceration. It is needful to withdraw the pins at the end of forty-eight or seventy-two hours, certainly, at the latest, on the fourth day, which procedure alone bears strong testimony in favour of their rejection, because union is at this time by no means firm, and any untoward movement may react prejudicially. Under these circumstances it is desirable, so long as cohesion is progressing between the labiæ, to have a class of sutures at our command which will enable us to keep the parts at rest and evade taxing the elasticity of the commissure. Furthermore, two needles cannot divide the strain so equably, or afford the relative support of three stitches of wire or gut.

In passing the sutures, a curved needle is the best to work with. It is preferable to a straight one, because it adapts itself more readily to the natural conformation of the parts, and it should be made to penetrate the entire thickness of the lip, with the exception of the mucous membrane. In its manipulation a needle-holder will assist you greatly. The needle of Lister, with a groove above the eye, into which the suture is designed to sink, is the most convenient for this purpose.



Dr. M‘Lellan's cannulated needle, ⅔ size.

The cannulated needle of Dr. M‘Lellan of Philadelphia might be tried, of which a woodcut is here given. The inventor claims that the handle offers firm support to the fingers of the operator, while great accuracy in the introduction of the sutures and complete exactness in the apposition of the parts are attained.

The highest or nasal suture is usually passed first, and no pains should be spared to see that it fulfils its function efficiently, for if there be any relaxation here the lip has in consequence an inclination to be drawn upwards. The second is placed at the opposite extremity, and one or two follow between these. The sutures may with advantage be inserted from alternate sides. In this way the balance of the lips is more equally sustained. Lastly, a sufficient number of threads of fine silk can be set aside for the prolabium. The sutures should not finally be secured till all are in their proper places, and care must be taken to see that the line of union reveals a fair and smooth outline. At this juncture you will find the clamps invaluable, for by their co-operation it is easy to perceive whether everything is on the same plane, and, if not, very little trouble will soon create a change for the better. In many cases of hare-lip a thick cord is visible running down the commissure. This arises from the inaccurate disposition of the labial margins, one being allowed to remain at a higher level than the other.

Many are in the habit of using a strip of plaster, extending from one cheek right round to the other, to relieve tension. It certainly does so, but it soon becomes soiled from the milk with which the child is fed, and the skin, in consequence, in the neighbourhood, becomes excoriated. I have frequently tried plaster, but have obtained excellent results without it. The late Dr. James G. Lyon, a surgeon gifted with rare taste and the highest manipulative skill, held the opinion that, so far from serving a useful purpose, plaster had a reverse tendency. Hainsby's truss, which I now show you, has all the advantages of plaster with none of its drawbacks. It may with benefit be worn for some time before operating.

Some surgeons are in the habit of keeping the patient under the influence of opium during the progress of resolution, and the practice is well worthy of an extended trial, though care must certainly be exercised in the exhibition of such an agent. Mr. Butcher commends the custom, and illustrates by numerous cases the efficacy of this drug in partially narcotizing the child; but it ought always to be borne in mind that it is of immense assistance during the performance of operations generally, and strengthens in a remarkable degree the power of chloroform or ether, if an opiate is given shortly before their inhalation is commenced. The patient, under this line of treatment, becomes peculiarly susceptible to the action of an anæsthetic, and at the same time remains long as well as deeply under its sway—a point of extreme practical value, for it permits the surgeon to proceed through the operation with less interruption than when the effect of the chloroform is constantly passing off, thus demanding it's fresh administration, and entailing, as a matter of course, until unconsciousness is reproduced, a complete cessation in the onward proceedings.

Operations about the mouth have always been tedious from this cause, and any method which renders them less so is one which ought to be cultivated.

In removing the stitches you will find it expedient to put the patient under chloroform. By its aid muscular resistance is overcome, and you can thus attain your object without endangering the safety of the recent union. Should you find, either before or when withdrawing the sutures, that any portion of the cut surfaces have failed to become adherent, do not interfere so far as operative measures are concerned, but postpone the rectifying of the defect till afterwards. I have on more than one occasion seen attempts to close small apertures resulting in the separation of the whole newly united tract—an unpleasant consummation, for although the lips are successfully re-apposed, the result can never rank with one in which primary coalition has been secured.—*Edinburgh Medical Journal, July*, 1883, *p.* 10.

38.—ON THE PERMANENT CURE OF HERNIA BY SUBCUTANEOUS INJECTION.

By Joseph H. Warren, A.M., M.D., Mem. Brit. Med. Assoc.; Mem. American Med. Association (Judiciary Council); &c.

It is strange that, in view of all the logical and scientific thinking of the present day, so many erroneous ideas should be perpetuated in regard to the permanent cure of hernia. Prof.

Gross, years ago, struck the keynote of the subject when he said that the only chance of curing this complaint lay in compression by a truss, or the inflammation produced by the subcutaneous injection of some fluid. Yet, how little is the pathology of such an operation understood, even at the present moment, by the great majority of medical men.

Wood's operation, about which, of late years, we have heard so much, has in it, indeed, *two* elements of failure. First, it seeks to draw together fibrous bands which are hard, firm, and immovable. This operation in itself excites theoretically very little local inflammation, and therefore there is no obvious reason that I can see why adhesion between these bands, so as to close the hernial canal, ever should take place. It is like operating for a lacerated cervix or hare-lip without paring the gaping edges. On this account, I suggested to Dr. Henry O. Marcy of Boston, U.S.A., the feasibility of freshening the fibrous edges of the hernial opening before occluding the canal by carbolised ligatures. This method, I understand, he has attempted, and I should think it offers a more rational chance of success than previous treatments by ligature.

The second objection to Wood's operation is, that when performed in the ordinary manner by wire sutures, it depends for its cure upon a process of granulation which, from its protracted duration, is fatal to a cure of hernia; and from its danger of producing an iliac abscess or a general pyæmia, may be fatal to the individual. When, however, operations which involve external incisions are performed under strictly antiseptic precautions, which reduce them theoretically to subcutaneous operations, the results are far more favourable than when the wounds are allowed to heal in the ordinary manner. This fact I have amply shown in my description of Czerny's method of operation in my Practical Treatise on Hernia.

The statement has been made that "the essence of success in hernial operations consists in setting up peritonitis in the sac, and in the ability to control the inflammation when started." This, of course, can apply only to cases of congenital hernia, and even in these cases is true only in a very modified manner. The essential element of success in the cure of congenital hernia, as in the cure of acquired hernia, is the *closure of the hernial rings and hernial canal.* It is true that such closure will at the same time obliterate the unclosed pouch of peritoneum, but if this pouch be the only thing that is occluded, there is nothing to prevent another protrusion of the peritoneum through the canal, which is still unclosed, forming what is termed the "acquired congenital form of hernia," the "encysted hernia of Sir Astley Cooper," or the "infantile hernia of Hey." But even supposing that a limited degree of local peritonitis is the result of our treatment we do not fear the result. On the contrary, we are rather rejoiced that it should occur, since it tends to complete the cure by causing adhesion between the visceral layers of the sac, and also between the parietal layer and the fasciæ forming the hernial canal.

The tissues to be irritated and organised into fibrous structure are the tendons and fasciæ forming and comprising both the internal and external hernial rings, together with the whole length of the hernial canal, and that the hernial sac is always to be thoroughly reduced before the operation whenever it is possible. If, perchance, the sac has become adherent to these rings or the canal, we can by a very little manipulation, such as most surgeons are capable of, lodge the point of the syringe between the sac and the borders of the canal, and deliver our injection *into* the fibrous tissue and *around* the hernial sac. A little inflammation of such a sac is not only not to be dreaded, but, on the contrary, rather to be desired.

The operation for the cure of hernia by subcutaneous injection is then successful, *not* because it produces a "tendinous irritation," that is an immediate contraction of fibrous tissues, but *because it produces a local inflammation without suppuration.* This is an important distinction, both as regards the theory and as regards the practical success and permanence of the operation. All other methods have accepted and expected suppuration as an accompaniment of the operative procedure, and have not been disappointed when they obtained it. This method avoids suppuration as it would every other unfavourable complication. Other methods cannot avoid suppuration; this method can, and does avoid it, when properly performed, and with the proper fluids.

As regards the comparative value of the fluids that have been used from time to time for injection, it is altogether probable that many have failed because they were absorbed without producing the amount of inflammation necessary to produce a reorganisation of fibrous tissue. Probably oak bark is specific in its action, because of all substances not destructive to the tissues, it refuses most obstinately to be absorbed before the inflammation set up by it, the ether and alcohol, shall have caused a sufficient cellular activity to render the regeneration of the normal fibrous tissue reasonably certain. All that by any possibility its astringent properties can do, is to aid perhaps in keeping the fibrous pillars of the hernial rings somewhat in their normal position, until the new tissue is properly organised into a firm growth.

All fibrous tissues of the body tend, when inflamed, not only to contraction, but to a permanence of contraction.

It requires the greatest patience, together with considerable mechanical skill, to overcome such permanent contractions when they have become fully organised.

While the inflammatory products are in the course of organisation and have not developed into firm and stable normal tissue, they may, by the intervention of other processes, tend either to resolution or to suppuration, both events resulting in destruction and absorption of inflammatory new growth either from a slow and imperfect healing, or from the antagonism of natural mechanical forces at work.

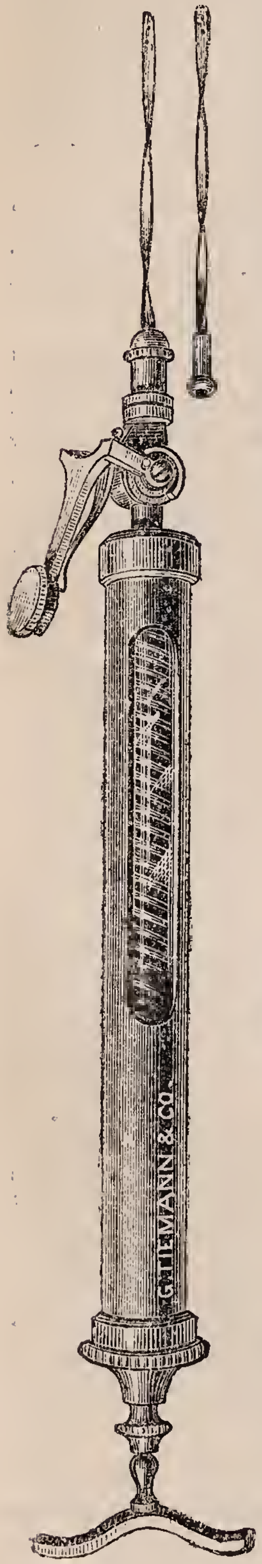
In no case have we seen any evidence of such resolution or absorption of inflammatory new growth when once it has become fully organised; therefore we must reason illogically when we make hernia an exception to the general rule.

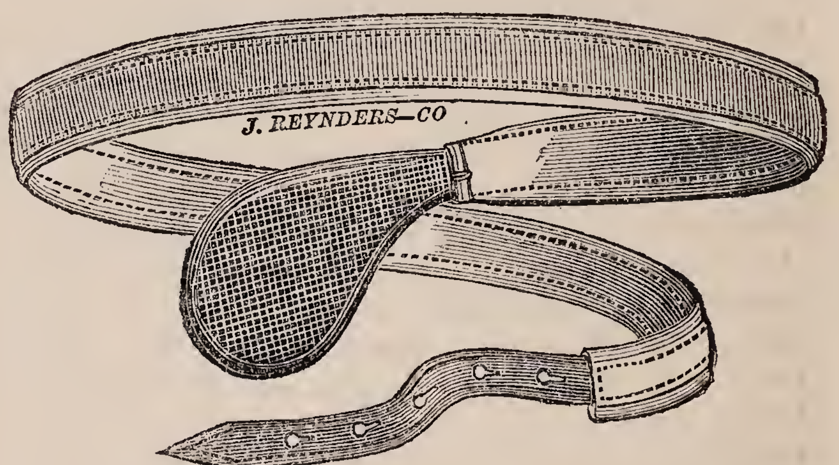
We have, then, seen the truth of the general law deduced by Billroth, and by Cornil and Ranvier, that all processes of repair tend to reproduce the tissue of the region where they are situated; that is, that these processes of repair are progressive in their nature until they attain a certain structure, which structure then becomes stable, as stable as normal tissue, and subject to the same laws of growth and decay. If a person has naturally weak abdominal fasciæ, how can any one expect a strengthening of one local portion to strengthen the whole abdominal area? In other words, it would be no unexpected event for a person to be permanently cured of an oblique inguinal hernia and then to suffer afterward from a direct hernia. Is this an argument against the value of the method of subcutaneous injection? Yet many talk as if they thought it was. In other words, the return of a hernia once retained, is not the only evidence that is essential. We must know *first* whether the fibrous tissue has ever seemed to be firmly organised, and *secondly*, whether the new hernia is precisely in the same locality as the original lesion. I have seen several cases and am cognisant of others where it was not.

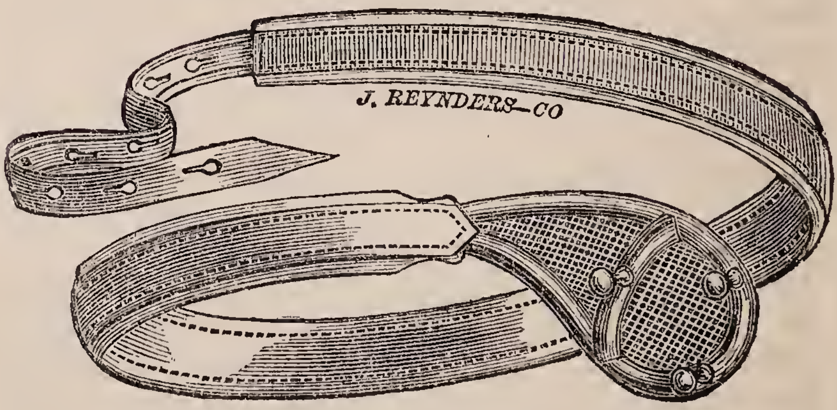
I have found that there is an urgent necessity in the majority of cases for a more stimulating injecting fluid than the simple extract of oak bark, and for an instrument which will more thoroughly and more effectually distribute the fluid upon the hernial rings and canal. Nevertheless, I should think that for children of the age of four or five, the simple extract, or the formula which I have called formula A, is amply sufficient (see formulæ at p. 289). Upon infants and children under four years of age I still refuse to operate, because I consider the pressure of a good bandage or truss is better. There are surgeons, however, who operate upon infants in arms, and they report good results.

I attribute my success in the operation mainly to three things. 1st. The use of a stimulating mixture (Formula C.) 2nd.

The use of an instrument the needle of which revolves and distributes the fluid more effectually than any instrument made upon the pattern of a hypodermic syringe. (This instrument is made by George Tiemann of New York, for whom Messrs. W. B. Hilliard and Sons, of 65, Renfield Street, Glasgow, are the agents). 3rd. The use of a truss as soon as possible after the operation. It is evident that an ordinary truss cannot be very early applied to the parts which are in a state of inflammation. For this reason I devised a truss, the pad of which is flat, and made of silver wire gauze. I call it the anatomical truss. It tends to keep the rings together, rather than to force them apart, as every stuffed pad must do. External applications can be made to the parts beneath if they become irritated or inflamed, and it is light and capable of such accurate adaptation to the tissues that it can be worn constantly with perfect comfort to the patient. I apply it eight or ten days after I have injected the hernial rings, and the patient wears it night and day constantly for







two or three months. For illustration I will cite three cases, one of direct hernia, operated on in June 1881, and the truss applied on the eighth day; another, double indirect, operated on in October 1881, and truss likewise applied; and a third case of oblique inguinal, operated on about a year ago, the truss being applied ten days after. I have seen these cases several times since the operation, and know that they remain cured and they do not wear trusses. The truss is equally valuable for a patient who has had no operation performed, and will be found to give more relief than any padded truss.

In view of the interest which has been shown in the method for the cure of hernia by injection, and owing to the fact that but few are familiar with the method and its application, I have prepared the following brief outline of the method, thinking that it might be of value to the readers of this paper.

This operation is no longer an experimental one nor of doubtful expediency, but has been fully established as safe and expedient. Much of the success of the operation depends upon the judgment of the operator, as shown in the selection of cases and in the after treatment. The injection will cure in cases irrespective of age; but the most favourable age is from four to twenty-one years. Before the age of four I do not think it expedient to operate. After twenty-one more care is required to obtain good results; but the best results are often obtained in those of advanced age. Sex seems to have no influence for good or bad. Occupation may have an after result in reproducing hernia at the same place as the first, if too great a strain is brought upon the place too soon after the operation, or near it where the first hernia is retained, a direct rupture occurring through weakened abdominal walls.

As in all operations, the success is greatest, other things being equal, in those of a healthy state. Constitutional disease, however caused, retards the process of cure and may prevent it. In such cases, tonics (as quinine or iron), to counteract the general debility, and specific remedies (mercury, iodides, &c.), to counteract the specific diseases are indicated, the operation being delayed until the system is built up.

Nervousness is to be considered on account of the time that is to be spent in bed on the back, and the nervous system, if highly excitable, should be toned down by appropriate remedies. An irritable spine is unfavourable to the operation.

The kinds of hernia enumerated in the order of the best results and least danger are inguinal, umbilical, and femoral. Large congenital herniæ in persons over forty are very unsatisfactory, as the two rings are practically fused into one, and there is no canal left for the injection to act on.

The hernia must be reduced. Irreducible hernia may often be reduced by patient trials. Taxis is to be aided by position, by ether, by ice poultices, and by subcutaneous injections of morphia sulphate and atropia sulphate, combined or separately. Adhesions may be broken by manipulation or by subcutaneous division, or the tumour may be gradually reduced by an elastic cup truss.

The hernia being reduced, the middle finger of the left hand is carried up into the opening of the external ring, the scrotum being invaginated. The reduced intestine is held back by this finger. The tip of the index finger placed in its natural position by the side of the middle finger, points to the site of the puncture for the needle of the syringe. This puncture is opposite the external ring. It is not made through the scrotum, but through the skin of the abdomen in the inguinal region. The needle is passed carefully into the canal, avoiding the cord and the vessels. It is evident that the operator must be a good anatomist and a skilled surgeon. The finger being in position the fluid is forcibly injected along the tract of the canal—not into the sac nor into the peritoneal cavity. The fluid is still injected as the needle is withdrawn, and at the same time the needle is revolved so that every part of the canal shall be bathed with fluid. The syringe which I have devised for my own use does this automatically, for, on opening the valve by pressing the lever, the spring on the piston rod forces out the fluid through the holes in the sides of the needle, which is at the same time rotated by the act of withdrawal, owing to its twisted form. I do not say that this instrument is necessary for a perfect result, but it makes the operation easier and simplifies the injection, so that the result is more likely to be favourable. The common hypodermic syringe will not answer, for it delivers the fluid against the sac, and not on the walls of the canal; and the scarf point is dangerous, as arteries may be wounded by it. An instrument which delivers the fluid only in drops is not of as much value as one that sprays the fluid forcibly on to the tissues.

When the injection has been made the ring will be felt to contract like a sphincter round the tip of the finger, and from my experience I do not expect a favourable result unless I feel this contraction. When the needle is withdrawn the finger is to be placed over the puncture to prevent the escape of fluid. This is also guarded against by making the puncture with the skin drawn tense and thus making a valve-like puncture.

The amount of fluid varies with the size of the hernia and the irritability of the tissues. The larger the hernia and the older the patient, the more stimulating should be the fluid, and the greater the amount injected. Inguinal hernia requires the greatest amount, while femoral requires the least—about one-half as much as inguinal. The fluid that I use is made according to one of the three following formulæ:—

Formula A.—For infants and children, whether the hernia be accidental or congenital.

℞. Fl. ext. quercus albæ, ℥ij, reduced by distillation to ℥j; alcohol (90 per cent.), ʒij; ether sulph., ʒj; morph. sulph., gr. ss. M. Sig. Inject 8-10 minims.

Formula B.—For old and long standing herniæ, whether congenital or acquired.

℞. Fl. ext. quercus albæ, ℥iv, reduced by distillation to ℥j; alcohol (90 per cent.), ʒiij; ether sulph., ʒij; morph. sulph., gr. ij. M. Sig. Inject 10-25 minims.

Formula C.—Best in the majority of cases.

℞. Fl. ext. quercus albæ, ℥vj, reduced by distillation to ℥ii; alcohol (90 per cent.), ℥ss; ether sulph., ʒii; morph. sulph., gr. iv; tinc. veratri viridis, ʒii. M. Sig. Inject 15-20 minims in small and recent herniæ; but 25-50 minims in large or old herniæ.

Note.—This fluid will cause a marked reduction of pulse and temperature, and it may be necessary to put a hot water bottle to the patient's feet. This reduction may last as long as 48 hours, and gives a decided advantage in obtaining a more decided local effect of the irritant.

By this combination I think that the best results will be obtained. Other remedies have been used, as iodine, ether, alcohol, sulphate of zinc, &c. The object of any fluid that is used is to cause irritation and set up effusion. Carbolic acid and similar fluids will not effect this, and consequently are not of use.

The injection is performed with the patient lying in bed, on his back, and being completed, a compress and spica bandage are applied. Pain and restlessness are to be subdued by sulphate of morphia, and a compress of cold water may be placed over the site of the operation if the pain is intense. Quiet and maintenance of the position on the back are to be insisted upon; but if the patient, for some urgent reason, turns upon his side or is restless within the twenty-four hours following the operation, the success of the operation is not of necessity destroyed, although it is endangered. The bowels are to be moved just before the operation and not again for several days. The urine may have to be drawn, but this is the exception. Light food is to be given and quiet maintained.

The slight fever that follows does not need medication as a rule. The injection is to be aided by rest and position, and by the pressure of a spica bandage. In eight or ten days, if everything has gone well, the patient may stand up, the operator supporting the parts with the hand, and if the opening is felt to be occluded, we may fit a light truss and let the patient go, cautioning him to favour himself for a short time. In a few months another examination is to be made, and if all is well the truss may be dispensed with.

If, during the treatment, an abscess forms, it is to be treated according to rule, being opened antiseptically, and constitutional symptoms met as they arise. An abscess should not occur, and shows that there has been an error in judgment, either in selecting the case, or in using too much or too stimulating a fluid. Every swelling is not an abscess. A swelling simulating an abscess may appear a few days after the operation, but in reality this is only effused lymph. This will be discoloured by the injection, and look as if there was decomposing blood in it. A few days will decide whether this is an abscess or not, as it will be absorbed or "point."

As a final result we may confidently expect a cure. In extreme cases more than one injection may be necessary. In no case is the operation dangerous any more than hypodermic medication is dangerous; and if it is not fully successful, it will at least better the state of the patient, inasmuch as it will contract the rings in a degree, and tend to retain the hernia by as much as the rings are contracted.

The object of the operation is to set up inflammation of a mild type in the fibrous tissues of the canal and rings. It does not aim to set up inflammation in the sac, nor to cause peritonitis, nor to set up an imaginative tendinous irritation. Neither does it avoid inflammation altogether.—*Glasgow Medical Journal, May,* 1883, *p.* 339.

39.—ON THE TREATMENT OF THE SAC IN HERNIOTOMY.

By A. F. McGill, F.R.C.S., Assistant-Surgeon to the Leeds General Infirmary.

Until a comparatively recent date, the sac of a strangulated hernia has been treated, during herniotomy, in one of two ways; it has either been opened and then left to take care of itself, or it has not been touched, the stricture being divided externally to it. The latter extraperitoneal operation has certain obvious advantages, but, unfortunately, it is found that it cannot, as a rule, be practised; either prolonged duration of the strangulation, or inability to reduce the gut, or the presence of omentum, which requires removal, or some other cause necessitates, in a large majority of cases, the opening of the sac before the completion of the operation. This being so, the question arises, what is the best thing to do with the sac when it has been incised and the hernia reduced in the usual manner? There are two courses open to us. (1.) We may leave it alone, or (2) we may fasten it up, and thus seal the peritoneal cavity. That first mentioned is the one usually taught and always described in the surgical text-books. After completion of the operation, we are told to bring the lips of the wound together, and leave the sac untouched. This was the natural thing to do at a time when the peritoneum was looked upon as a membrane, the wounding of which was fraught with danger to the patient, and not improbably led to his death. Then the insertion of a suture through the peritoneum was looked upon as a rash proceeding, and one which, if possible, should be avoided. Now, fortunately, abdominal surgery has reached a further stage of development, and we know that there is no part of the body more tolerant of surgical interference than the abdominal cavity. We know also that it is highly advantageous, in all operations involving the opening of the abdomen, to carefully close the cavity by bringing peritoneum into contact with peritoneum, and thus prevent the entrance of pus or any other inflammatory product. This being so, there seems no sufficient reason why herniotomy should be an exception to the general rule; and we may conclude that the peritoneal cavity should be occluded in every case.

The methods by which this may be effected are four in number. 1. The sutures may be inserted through both skin and sac, both skin and sac being approximated at the same time. 2. The margins of the sac may be separated from the tissues external to it, and brought together by catgut, the skin being united by a second row of sutures. 3. The neck of the sac may be ligatured and the sac removed. 4. The neck of the sac may be ligatured and the sac left in position.

1. The sutures may be inserted through both skin and sac at the same time: in other words, the wound may be treated like any other abdominal wound, and stitched up in the same manner as the incision after ovariotomy or other abdominal section. This method of completing the operation is one which would, I suppose, naturally occur to any surgeon whose surgical experience is of recent date, and may be considered the first step towards an improved method of procedure. Though inferior to methods to be described further on, it is still applicable in certain cases. When the sac and skin are closely adherent, and make what is, in fact, one thin covering to the hernia, as is sometimes found in umbilical cases, it may be treated in this manner with advantage. The following case is illustrative. A man aged 52, had in February 1879, been suffering from an umbilical hernia for fifteen years. He did not wear a truss, for the rupture gave him little inconvenience. Five days before I saw him, subacute symptoms of obstruction had commenced without apparent cause, and the day before Mr. G. S. Taylor had

visited him for the first time. On examination, we found an umbilical hernia about the size of a cocoa-nut, which we were unable to reduce. Though the symptoms were not very urgent, we determined to operate; this I did by opening directly into the sac, dividing the stricture, and returning the contents. The operation was completed by bringing the inner surfaces of the sac into contact by numerous sutures introduced through the skin. The patient recovered without a bad symptom, and is still alive; the hernia is of smaller size than it was before the operation, and is easily retained in position by a truss.

2. The sac may be separated from the tissues external to it till a free margin is obtained. These may be brought together by means of catgut-sutures, and the skin afterwards approximated by another row placed more superficially. This method is, I think, preferable to that already described, as a more perfect closure of the sac can be effected. It may be adopted when complete separation of the sac is impossible, as in the following case. On June 27th, Mr. Charles Richardson asked me to see with him a middle-aged married woman, who was suffering from obstruction of the bowels, caused by a large strangulated umbilical hernia. On examination, the sac was seen to be as large as a child's head. The skin over the upper half being inflamed and ulcerated, we determined to operate, and opened the sac over its lower half; the stricture being divided, the protruding gut was returned, and a large portion of omentum, previously ligatured with catgut in several places, was removed. The sac was then partially separated, but the upper inflamed portion was so firmly adherent to the ulcerated skin, that separation was at this part impossible. The peritoneal cavity was closed by carefully stitching the sac with catgut, and, after the insertion of a drainage-tube, the skin was approximated by another row. Recovery was delayed by suppuration and ulceration continuing in the upper inflamed part; but this rather adds to the interest of the case, as owing to the careful closing of the abdominal cavity, no symptoms of peritonitis supervened. It is worth considering whether, in another case of this kind, it would not be advisable to remove the inflamed skin and sac, and thus lessen the chance of complications arising from its presence.

3. The sac may be dissected out, ligatured at its neck, and removed. This, in my opinion, is the best course to adopt; it presents two great advantages. It most effectually closes the abdominal cavity, and it to a certain extent prevents the recurrence of the rupture; in other words, it diminishes the risk of the operation, and it improves the result. The separation of the sac from the surrounding tissues is sometimes a tedious,

sometimes a very simple, proceeding; speaking generally, we may say that, in cases of femoral hernia, the separation will be effected with little trouble; whereas, in inguinal hernias, especially if of long standing, and of large size, some difficulty may be expected. When separated, a stout No. 3 catgut ligature is applied, and the sac is removed with scissors. I select the two following cases as exemplifying this treatment, because they are of interest in other ways. In December of last year, Dr. Coleman asked me to see a man aged 56, who had been suffering from severe symptoms of strangulated hernia for eighteen hours. He had worn a truss for years, but had left it off the day before, and, the rupture having descended suddenly, he was seized with violent pain, soon followed by vomiting. It having been decided to operate, the sac was reached and opened in the usual manner, and the stricture, which was very tight, was divided on a director; a coil of intestine about three inches in length was seen, and an attempt was made to reduce it. After applying taxis direct to the gut for about a minute, some fluid fæces were seen in the wound; the intestine was then drawn down, and a transverse rent, about three-quarters of an inch in length, was discovered at the part which corresponded with the seat of stricture. It was evidently caused either by the hernia-knife which had been used to divide the stricture, or, as I believe, by pressing the already ulcerated gut against the sharp fibrous edge, which prevented reduction. As the gut was in fairly good condition, I determined to stitch up the opening. This was done with fine catgut-sutures passed between the serous and mucous coats, thus bringing the peritoneal surfaces into apposition; some omentum was next tied in several pieces, and removed. The sac was stripped from the surrounding tissues without difficulty, its neck ligatured, and the operation completed by bringing the skin together with a few points of suture. The patient had no bad symptoms, and made a good recovery. The second case I saw last week with Messrs. Glaister and Hurtley of Rothwell. The patient was a man aged 60, who had been unable to work for four days; during that time, he had vomited a little, and had complained of some abdominal pain. He had not sent for medical aid till the morning of the day on which I saw him; Mr. Hurtley then found that he had a right inguinal hernia of considerable size, which, however, could be reduced with ease; in the left groin was a small lump, hardly of the size of a walnut, which it was thought was probably a small hernia. When I saw him, we determined to cut down on this lump, and ascertain its nature. It was, as we expected, a small hernial sac, protruding the femoral ring. Inside the sac was a small piece of intestine, which implicated only part of the circumference of the gut; it was protruding through an opening so small, that it would not admit the tip of my little finger; it was easily reduced, and the sac, which did not require any separation from the surrounding tissues, was ligatured at its neck, and the operation completed. Mr. Glaister told me that, if anything went wrong, he would let me know; as I have not heard from him, I presume the patient is by this time convalescent.

4. The neck of the sac may be ligatured and the sac left in position. I am unable to give any case in which this has been done, as I have not as yet had an opportunity of putting it in practice. It is a plan which I think might prove useful in cases of congenital hernia. In these cases, as the sac is the tunica vaginalis, it is plain that it cannot be removed. I would, therefore propose, after carefully separating the cord, to ligature the neck, and in this way effect artificially the division which should exist naturally between the cavity of the peritoneum and that of the tunica vaginalis.

The value of any novel method of procedure can best be tested by results; unfortunately, operation statistics to be of value must be large in number, and this is more particularly the case with herniotomy, as in this operation many factors contribute to a successful or fatal result. The following facts are given for what they are worth. During last year, herniotomy was practised seventeen times in the Leeds General Infirmary; in all cases, when practicable, the peritoneal cavity was occluded. Of these cases, three died; in two of these the gut was found to be gangrenous at the time of operation; in the third case, a child, five months old, death resulted from subsequent bursting of the gut within the abdominal cavity. During the last four months I have operated ten times by one or other of the methods described in this paper; of these operations, two were fatal. The first was a woman in whom strangulation had existed for seven days; four inches of gangrenous bowel were excised, and the bowel stitched together with catgut; the patient, who was extremely collapsed at the time of the operation, died a few hours after its completion. The second was a woman, aged 76, with a large strangulated umbilical hernia; she did well for a fortnight, when diarrhœa supervened, and she gradually sank and died in the fourth week. Taking these two series of cases together, we find twenty-seven cases with five deaths; but it is evident that the five deaths would in all probability have occurred whatever method of operating had been adopted. These statistics are, therefore, as far as they go, satisfactory, and lead me to think that surgeons who occlude the sac in all cases of operation for strangulated hernia will in the future have more successful results than they have had in the past.—*British Medical Journal, Sept.* 15, 1883, *p.* 527.

40.—RADICAL CURE OF FEMORAL HERNIA—OPERATION.

By Walter H. Brown, Surgeon to the Leeds Dispensary.

A female, aged sixty, had for years been troubled with a large femoral hernia. Many varieties of truss had been tried, but all failed to afford relief, and the hernia had been strangulated two or three times for short periods. For reasons which I will give below I deemed it desirable to make an attempt to effect a radical cure, to which end I performed the following operation.

I made an incision as for strangulated bowel, and opened the sac. I reduced the bowel, and then found that the crural ring was large enough to admit three fingers; lying at the posterior part of the sac was a large portion of omentum, which was adherent to the sac, and, as in separating these adhesions the omentum was freely handled, I removed the portion which had been in the sac, and tied the stump with a stout silk ligature, leaving the end of the ligature long. I then dissected out the sac, and, after ligaturing the neck, removed the entire sac. I had next a large piece of omentum removed by a ligature within the abdominal cavity just opposite the crural ring, the ligature being brought out through a small opening I had made in the peritoneum close to the ligatured neck of the sac. It now occurred to me that I might use this omentum as a plug to close the crural ring. I therefore drew the omentum down until it was in contact with the neck of the sac, and found that it remained in its new position without much tension. I thus had the ligatured neck of the sac and the ligatured stump of the omentum to resist the return of the hernia. The wound was closed in the ordinary way, the two silk ligatures being brought out at the lower end.

It is unnecessary to give further details of the progress of the case, as the woman made a good recovery. There was no disturbance of temperature, the wound healed by first intention save at the point through which the ligatures came; the ligature on the neck of the sac came away on the tenth day, but the one on the omentum remaining firm at the end of the sixteenth day, it was cut short and the wound healed in two days.

The operation was performed in accordance with Professor Lister's system of antiseptics, and the wound dressed with salicylic silk as introduced by Mr. McGill, of Leeds. It is now five months since the operation, and the result so far has been perfectly satisfactory. There is no hernia, the woman is enabled to perform her household and other duties in comfort; she wears a pad similar to that of an ordinary truss over the scar in order to support the necessarily weak ring. I am fully aware that an operation such as I have described is open to criticism, and I therefore wish before closing to draw attention to my reasons for operating. First, the patient being weary and discomfited by her ailment was willing to accept the risks of operation and possible failure after they had been fully explained. Secondly, a fair trial had been given to mechanical support, and the results had been entirely unsuccessful. Thirdly, I deemed it right to attempt a cure by operation, bearing in mind the fact that of late we have been in the habit of dealing more freely with cases which involve interference with the peritoneum. The brilliant results obtained by Mr. Banks, of Liverpool, and Mr. Spanton, of Hanley, in dealing with inguinal herniæ, led me to undertake the operation just described, and Mr. Spencer of York has performed a similar operation with like success.

Of course the number of cases in which one would operate would be limited to those in which mechanical support had failed to give relief.—*Lancet, June* 23, 1883, *p.* 1086.

41.—ON FISSURES AND ULCERS OF THE RECTUM.

By Edward Hamilton, F.R.C.S.I., Surgeon to Steevens' Hospital, Dublin.

A fissure of the rectum, although the local lesion appears so trifling, gives rise to more intense suffering than any other affection occurring in this locality—in fact, so pronounced is this pain, and so remarkable in its character; that it has been the source of much perplexity, and its cause is still a disputed point in surgical pathology.

Blaudin and Dupuytren classified fissures of the rectum into those *below*, *opposite to*, and *above* the sphincter. Those which occur below the muscle are comparatively unimportant superficial tears or cracks in the muco-cutaneous membrane at the verge, and may be the result of pruritus or prurigo, or of straining to pass a large costive motion. If the patient's health is good, they heal quickly, and give rise to little pain or trouble. Those above the sphincter present more the characters of ordinary ulcer of the rectum.

Those which are placed *on the sphincter* constitute the true fissure of Boyer—sphincteric fissure. The fibres of the muscle are laid bare by ulceration, and they form the immediate floor or base of the fissure. In form it is like a pegtop, boat-shaped above; it narrows gradually to a mere groove at the anal verge. This shape explains the true nature of the affection; it is in reality an ulcer, and, when expanded, presents an open sore with a grayish or sometimes with a florid red colour, depressed surface, and circular outline, but the contraction of the bowel at the anus puckers its lower border into a groove or fissure. It is frequently described as the "irritable ulcer."

The pain which indicates the existence of this disease is characterised by two remarkable features—the time at which it occurs, and its intensity. It does not manifest itself as we might *à priori* expect during the act of defecation, when the sore was being opened, and its surface put upon the strain. It does not, for the most part, set in until after an interval of half or a quarter of an hour, and it persists during a period varying from one to eight hours. It is a wearing, nagging pain of a most depressing kind, which frequently obliges the sufferer to lie down after the bowels have been moved, and causes him to dread the operation, and leads him to defer it as long as possible. Thus constipation is engendered, and the distress increased tenfold. Instinct leads him to adopt a precaution which the surgeon frequently recommends—to have the action of the bowels, if possible, at night before the usual hour for retiring to bed. This peculiar pain is frequently attributed to neuralgia without local lesion. A knowledge of this fact is necessary to guard you against falling into the error, and will lead you to submit all such cases to a careful physical examination.

Temperament has much to say to the intensity of the suffering in different individuals—hence the classification proposed by M. Gosselin into "tolérantes" and "intolérantes." We are naturally led to seek some explanation of a symptom so marked and so peculiar. Boyer attributes it to spasm of the sphincter—Van Buren to a fascicular spasm or cramp of the muscular fibres, induced by the local irritation of the ulcer. Quain compares it to the photophobia and spasm of strumous ophthalmia. Gosselin regards it as a true neurosis—neuralgic pain, and hence much influenced by idiosyncracy. One cannot easily regard any of these explanations as satisfactory. It has often occurred to me that during the act of defecation a minute particle of fæcal matter becomes lodged in the fissure, and undergoing changes from atmospheric influence and decomposition, may act as a direct irritant to the surface of the ulcer. The condition of the sore, the nature of the discharge, and the situation of the fissure may account for the degrees in the severity of the pain. A slight streak of blood may stain the fæcal mass, and there may be a discharge of muco-purulent fluid.

Previous to the writings of the great French surgeon, Boyer, the treatment of fissure was empirical and unsatisfactory; lotions of various kinds, salves and unguents were employed, with doubtful success. The application of caustics offered better results. Boyer was impressed with the idea that spasm of the muscular floor of the fissure kept it from healing, and he adopted the practice of procuring a quiescent state of it by free division of the muscle through its entire substance. Should the disease occupy the mesian line he recommends such an incision on each side of it. A bougie was then introduced and lint packed round it so as to ensure healing by granulation. Copeland, Quain and other British surgeons regard this operation as unnecessarily severe, and have determined that division of those fibres of the sphincter which form the immediate base of the fissure is quite sufficient to enable it to heal. This limited operation is now the established method of treatment, and can be easily accomplished by the aid of a speculum.

The principle of paralysing the action of the sphincter has been carried out in another way without a cutting operation. Recamiêr, in 1829, proposed to the Academy of Medicine at Paris that the sphincter could be brought into a state of temporary paralysis by a rhythmic kneading of its fibres between the fingers inserted into the bowels and the thumbs on the outside, *massage cadencé*. This process, although tedious and painful, was attended with remarkable success, and promoted the healing of fissures and ulcers.

Maisonneuve, taking up the idea, adopted a more rapid, but also a much more painful, proceeding—one, indeed, which, without anæsthetics, may justly merit the opprobrium of "brutal" with which it has been stigmatised. He introduced the fingers consecutively through the anus until the entire hand had entered the bowel, it was then suddenly withdrawn, I need hardly say, with the effect of producing inertia of the muscular fibres for some considerable time, perhaps longer than was requisite for the healing of the fissure, or was desirable. This operation was subsequently modified and rendered much less formidable by using the fingers only and by causing anæsthesia.

Van Buren, from an extended experience of forcible dilatatation, recommends it highly, not only in fissure, where he suggests it may have some of the effect of "nerve stretching" in neuralgia, but in all cases where it is desirable to procure a quiescent state of the sphincter for some time; hence he advocates it as a preliminary operation on hemorrhoids.

Mr. Allingham always adopts it; and you must have seen that in this hospital we resort to it in all operations on the lower bowel. I believe it is not, as a rule, much practised in Dublin hospitals, probably from natural prejudice against the form in which it was first presented to the profession; but it seems to me to be sound in principle, and may be an absolute necessity in cases where cutting instruments are forbidden, either by the patient's wish or by peculiarity of constitution. We adopt the following plan:—The thumbs are introduced one after another into the anal opening, while the palms of the hands are stretched out over the buttock of either side. The adequate dilatation of the sphincter requires the exercise of a much stronger muscular effort than you will be prepared for. Gradual expansion by the fingers day after day has occasionally succeeded, but cannot be commended.

Professor Joubert has advocated the complete excision of the walls of the fissure; but, as the dissection must be preceded by stretching the sphincter, the credit of the result cannot be indisputably claimed for the cutting operation.

Fissure is a frequent complication of polypus, and is constantly found to intensify the sufferings of hæmorrhoids. Syme alludes to a papilla which he has observed at the superficial termination of the fissure, an appearance also frequently present in fistula and ulcer. This disease is said by most authorities to be of more frequent occurrence in the female than the male, although, I think, I have seen as many of one as the other. No age is exempt; we find it in the infant at the breast and in its octogenarian grandmother.

The symptoms of ulcer of the rectum do not present the same pronounced character as those of true fissure; they correspond more with the "fissures tolérantes" of Gosselin—dull aching pain in the back, heat and smarting, increased by the act of defecation, more especially if the evacuations are firm in consistence, frequent desire for the act, particularly in the morning hours; in the intervals a discharge of muco-purulent matter which stains the dress, sometimes tinged with blood. The suffering is increased when this discharge is lessened, as if it facilitated the passage of the mass over the tender surface. On examining the part with the finger its point sinks into a cup-like depression, with its margin slightly raised and sometimes a little indurated. The pain may be severe if the ulcer approach the anal verge.

The etiology of this disease is a matter of much practical interest. We should make a great mistake if we were to regard them as in all cases mere local affections; on the contrary, they are often caused by very serious morbid conditions of the entire system, such as scrofula, venereal, or cancer. Local causes no doubt give rise to many ulcers of the rectum. Forcible straining to evacuate a costive stool may cause a trifling tear of the mucous membrane, which, if the health be not robust, fails to cicatrise and degenerates into chronic disease. Solid matters which have resisted the solvent influence of the digestive fluids may scratch the membrane or lodge between its folds, and acting as an irritant produce ulceration. Foreign substances introduced into the rectum from below or the efforts to remove them when impacted may produce a similar result. The bowel may be bruised against the sacrum in tedious labour. Much stress has been laid on this as a frequent factor in causing ulceration of the bowel, and the stricture consequent on its cicatrisation as accounting for the greater frequency of the disease in females. The rupture of a small vein or of an internal hemorrhoid may be the starting-point. These local causes of ulcer of the rectum may all be regarded as "traumatic."

Dysentery is well known to be a fruitful source of ulcerations, which, as a rule, heal and disappear with the subsidence of the irritation in the bowel, but occasionally such a spot will remain and degenerate into a chronic sore. It is a very interesting pathological fact that certain conditions of the system at large or of organs quite remote have a tendency to develop special forms of ulceration in the digestive canal— the ulcer of the stomach, so frequently associated with the anæmia of the chlorotic female; the ulcer of the duodenum to which Mr. Curling has drawn attention in its connexion with extensive implication of the skin in scalds and burns; the dothienentérite of typhoid fever; and no doubt there are others as yet unnoticed.

Some of those ulcers are supposed to depend on deposition of tubercle in the intestinal wall. You are familiar with the change which this pathological element almost invariably undergoes of degeneration and softening. Such a spot may be the starting-point of the disease which we are considering, and whatever views we may hold respecting the existence of such a condition as a strumous or scrofulous diathesis, every practical surgeon knows that the peculiar state of the system to which this term has been applied is very unfavourable to the healing process.

Again, a simple fissure may become inoculated with the discharge from a chancroid sore, especially in the female. This may extend into the rectum by a slow and gradual process, or where the constitution is impaired by intemperance, irregular habits, and want of food, it may become phagedænic and spread rapidly into the bowel. True syphilis is very rare; it was once common enough in our convict settlements, but is not so now. Malignant disease as a cause of ulceration we will consider on a future occasion.

We have seen that the management of fissure can be carried to a successful issue by surgical operation alone—not so the chronic ulcer, in which it must be combined with medical and dietetic treatment. It is necessary to give the bowel as much rest and to keep the discharges as unirritating as possible, both in their nature and consistence. With this object the value of milk is recognised by all practical surgeons; it may be combined with rice, sago, tapioca, revalenta, and a variety of farinaceous food. Meat in small quantity and not over-cooked may be allowed once a day. Alcoholic stimulants are, as a rule, to be avoided. The patient should enjoy good air, as he must be limited as to exercise; he should not walk much, but rather recline, as the weight of the super-imposed intestines maintains an injurious influence on the ulcer. For the same reason carriage exercise is to be avoided, as it almost always causes undue action of the bowels, and the shaking from side to side disturbs the diseased part. Boating may be enjoyed without prejudice. The tendency to frequent discharges should be controlled by bismuth or the acetate of lead and opium pill given at night.

A great many local applications have been in repute for the treatment of these ulcers. Dupuytren had great faith in an ointment composed of one drachm of acetate of lead, one drachm of extract of belladonna, and six drachms of prepared lard. Nitrate of silver, sulphate of copper, and sulphate of iron, have each had strong advocates. Should these topical applications fail the ulcer should be incised, for the double purpose of obtaining the stimulation of the knife and dividing the fibres of the sphincter and getting rid of one source of irritation by setting them at rest for a time. In order to do this effectually a gorget must be employed. It is most important to bear in mind that this ulcer is very liable to be mistaken for chronic dysentery or even diarrhœa. In this connexion we have to consider whether such a disease as painful spasm of the sphincter exists as an essential condition, or is it always to be explained as a consequence of some other local lesion. Boyer, Dupuytren, and Brodie have given a strong opinion that such a disease does exist, while on the other hand, authorities which have quite as much weight are to be found in the opposite scale. I have no hesitation in stating that I have myself met with more than one individual, of highly nervous temperament and generally excitable, in whom this muscle has been the subject of spasm attended with severe pain, not as a permanent condition, but a transitory recurring cramp, causing much suffering and inconvenience. Often associated with irregularity of the bowels, it usually subsides under appropriate medical treatment, mild aperients, tonics, and the warm bath, and seldom demands the heroic measure proposed by Boyer—division of the sphincter.—*Dublin Journal of Medical Science, April* 1883, *p.* 364.

42.—ON THE TREATMENT OF HEMORRHOIDS.

By Edward Hamilton, F.R.C.S.I., Surgeon to Steevens' Hospital, Dublin.

External Piles.—The diagnosis of external piles is not difficult. All that is required is, by a careful examination, to guard against the misleading statements of patients themselves, who designate troubles of every kind in the anal cleft by the name of piles.

The treatment required for external piles is simple enough when contrasted with that demanded by the internal form—rest in the horizontal position—cold, if it is applied continuously, as by a bladder of ice, will afford great relief. Warm stupes are often more convenient, and appear to give greater comfort to some patients, especially those who are advanced in life. They act by causing a general relaxation of the tissues. If the tension is great you may pass a sharp-pointed bistoury through the centre of the pile, and turn out the clot, thus expediting the natural process of cure. Leeches are sometimes of use; they should be applied close to, but not on, the pile, and be followed by poultices of linseed meal. When the more acute symptoms have passed away, astringents may be applied either as lotions or ointments. There can be no doubt that the old remedy, gall ointment, has established a very wide-spread reputation for the relief of those tumours. Combined with opium, as in the compound ointment of galls, it affords most beneficial results. Surgical operations are seldom required in the treatment of external piles, and they may be followed by unpleasant results. However, should they be troublesome, and the patient presses for their removal, you may snip them off with a bistoury or scissors. The bleeding can be easily controlled by ordinary means. You should, however, be very careful not to remove too much, and to distinguish between the true pile and the tabs of skin which so often lie external to them, or the mucous lining of the bowel, which is always more or less prolapsed. I need scarcely insist on the necessity of removing all exciting causes of the disease.

Internal Piles.—Much confusion and obscurity exists among systematic writers respecting the nature of internal piles. This may be in some measure accounted for by the fact that there are various kinds of tumours within the sphincter, each of which has been described by individual authors as the only morbid growth to which the term should be correctly applied, as being the true type of the disease. We may clear away some of this confusion by defining accurately three forms of growths from the wall of the bowel, which must be regarded as three distinct varieties of the internal pile. The most suitable appellations seem to me to be—the *venous*, the *columnar*, the *nævoid*.

The first (*venous*) differ in no respect from external piles, except in their position, and would seem to correspond to the variety to which Bransby Cooper has given the title "extero-internal." The veins of the hæmorrhoidal plexus above the sphincter are implicated, and being liable to be extruded during the act of defecation, and to become constricted, they pour out blood in considerable quantity, and great pain is caused by the spasm of the muscle. When they are habitually protruded, the tone of the muscle is lost, and they escape through the anal opening on the least exertion, or even the upright position. They present the deep purple or plum-colour indicative of venous congestion.

The second variety, for which I would suggest the term *columnar pile*, to denote its pathology, consist essentially of hypertrophy of the folds of mucous membrane, to which I have drawn your attention, surrounding the anal opening, the pillars of Glisson. They have a red, almost vermilion colour, an elongated form, and contain within them one of the descending parallel branches of the hæmorrhoidal artery, to which I have drawn your attention. Hence, when they become ulcerated, they bleed very profusely, with bright arterial blood, which is often ejected with considerable force; it is seldom sufficiently elongated to protrude completely through the anus. The late Mr. Colles gives an account of the pathology of these tumours:—"On slitting up the rectum I saw three vessels, as large as crow-quills, running for some distance down the intestine, and then dividing into a number of branches. These vessels ramified very profusely, and each seemed, by interweaving of its branches, to form one of these tumours. The trunks and branches are covered only by the lining membrane of the intestine." I may add that these vessels can very frequently be felt pulsating in the wall of the bowel, by the finger passed above the bulbous extremity of the pile.

The third form, or *nævoid*, has been described under the title "vascular tumour" of the rectum. Mr. Houston, in the Dublin Journal of Med. Science, has described these vascular tumours of the rectum. He says they may occur as a complication of ordinary varicose piles, on the surface of which they form a painful thickening or spongy mass, pouring out blood of a bright arterial colour, protruding through the anus, and causing dilatation of that opening, having a peculiar strawberry appearance resembling the conjunctiva in chronic inflammation. Another variety would appear to exist on the surface of the mucous membrane independent of any other alteration of structure. This latter would appear to be the true nævoid pile, resembling morbid erectile fissure elsewhere. Mr. Houston gives us the caution that the pressure of the finger during examination is liable to cause the temporary subsidence of the tumour, and thus disappoint the surgeon. This form of the disease is especially liable to attack persons of the so-called sanguine temperament, with florid complexion, light hair, and blue eyes. In such the capillary system appears to be specially developed, with a tendency to telangiectasis. Blood of a florid arterial colour is poured out in large quantity. This may assume a dark hue if retained in the bowel. This bleeding is sometimes alluded to as a salutary exhalation, and apprehensions have been expressed as to the result of its arrest. However the loss of venous blood may be borne by the system, there can be no doubt that the drain of arterial blood in such cases produces marked anæmia, and must be regarded as the reverse of salutary. The nature of the columnar and nævoid piles easily explain the danger which would attend the removal of either by simple cutting. The vessels which freely supply both these varieties would retract, and being placed in a loose, warm cavity, would continue to pour out blood in very considerable quantity, while their deep situation would cause great difficulty in dealing with them.

Internal piles may protrude at the anal opening, and becoming much congested, the sphincter being at the same time in a state of spasm, constitutes most distressing and truly painful strangulation. The patient, during this attack, can neither sit, stand, nor walk. The very idea of any action of the bowel is so distressing as to make the patient shrink from it continually. There is at the same time high fever, and occasionally the constriction proceeds so far as to cause the piles to slough, creating great alarm to the medical attendant and the patient's friends. Fortunately, however, this complication is not so formidable in its results as the local symptoms would lead us to suppose, or which we would be inclined to expect. The sloughing pile is readily detached, and the part heals with surprising facility—nature accomplishing, by this rude process, an effectual and usually permanent cure. In this irritation the organs in the vicinity sympathise very closely. The bladder is irritable, and the urine may be retained completely.

With reference to the diagnosis of internal hemorrhoids, as the name implies, bleeding is a constant and a prominent symptom, but every case of blood discharge from the bowels must not be too hurriedly attributed to piles without due and careful examination. It may proceed from any part of the canal higher up. In the child it is an important factor in the diagnosis of intussusceptio, or of rectal polypus, which has so many other symptoms in common. Prolapsus recti must be carefully distinguished from piles. They are constantly confounded in the popular mind, and almost always co-exist.

The treatment of internal piles may be either palliative or operative. The first differs in no respect from the method which we have laid down for external piles, There is, however, a plan of treatment which is more called for in the internal variety of the venous class, although beneficial in all forms of the disease. I allude to careful management of the bowels, not by the continual use of purgative medicines, but by bringing them under the all-powerful influence of habit. Nothing is so important as to keep the bowels free. One costive evacuation will undo the work of months. For this purpose nothing is really better than the old electuary of sulphur and bitart. potash, with the addition of confection of pepper, or, if the bowels are obstinate, confection of senna. This medicine acts gently as a laxative, but yet efficiently. The confection of pepper, deduced from the celebrated quack nostrum, "Ward's Paste," has long had a great reputation in the treatment of piles, and many theories have been advanced to explain its action. The most rational one would appear to be that it acts as a powerful stimulant to the capillaries of the mucous membrane, and by causing rapidity of circulation relieves the congestion below. It has even been used as a local application (Sir B. Brodie alludes to a patient who "stuffed" his rectum with it), although one would regard it as likely to cause severe pain and smarting. As soon as the severe symptoms subside, the patient should be directed to use each morning an injection of cold spring water with the syphon enema tube. This acts beneficially in many ways:—1. The regular use of it entails the necessity of attending to the action of the bowels, at the same period of each day; and it is truly a matter of wonder how they can be thus brought to act with undeviating certainty. 2. The fluid serves to soften the evacuation and render it less irritating to the surface of the gut. 3. The cold acts as a direct tonic to the lining membrane, removing the tendency to prolapse or to hemorrhage. If this mode of treatment were adopted in time, and fully and regularly carried out, hemorrhoidal disease would be comparatively rare.

The *treatment of internal piles by surgical operation* has always been beset with considerable difficulty, arising out of the very nature of the case and the surrounding conditions. The subject has, therefore, exercised the ingenuity of surgeons, and a great many suggestions have been made from time to time with a view to establish some safe, efficient, and at the same time facile operation. Abscission, ligature, cautery—actual or potential, hypodermic injection, ecraseur, and crushing, have each had their advocates.

Abscission.—The removal of internal pile by simple cutting instruments has undoubtedly often been followed by alarming and fatal hemorrhage, and on that account has been almost completely abandoned; and yet the late Mr. Colles regarded the danger of tetanus following ligature as greater and more imminent than that of hemorrhage following excision. He practised this operation on what he describes as vascular tumour, and which he has found on dissection to be fed by an artery as large as a crow's quill. He thus describes his mode of dealing with them:—"The tumours having been made to protrude by means of a purgative injection, I direct my assistant to pass a hook, or common tenaculum, through one of the largest, while I seize another lengthways with a polypus forceps; then, drawing the tumour a little towards the axis of the gut, with a large pair of scissors, passed behind the forceps, I cut off all that portion which is engaged between its blades. I then proceed in the same manner to remove those tumours which the assistant holds transfixed by the hook. By fastening and drawing out the tumour with the forceps we much facilitate its removal by the scissors. Proceeding in this way I guard against these tumours being drawn up within the sphincter as soon as the first had been removed. I do not think that any case will require the removal of more than three of these tumours, and not unfrequently the cure will be ensured by cutting off two only of them. When the operation is finished the protruded parts generally retire within the sphincter. Should any part remain out it must be completely pushed in with the finger, in order to guard against hemorrhage. I take care not to prolong my incision higher on the bowel than what I conceive will, when replaced, lie within the circle of the sphincter, for if we cut the gut higher up, this part, when returned, may bleed from not having any surface opposed to it. Besides, we know that by cutting higher up we are in danger of cutting the trunk of the vessel, instead of confining our incision to the tumour, which is composed solely by the convolutions of its very minute branches." There can be no doubt that the bleeding from this limited wound could easily be controlled by ordinary surgical methods, and yet this success has not been attained in the hands of other surgeons, whether from cutting too freely or operating on a different variety of internal piles. Alarming, and too often fatal, hemorrhage has resulted from this operation. It is, therefore, my duty to warn you not to adopt this method—at all events in the earlier part of your surgical career.

Ligature.—The ligature has long maintained its supremacy in the treatment of piles, and no method has yet been proposed which can completely supersede it, as there are still examples of the disease which cannot be mastered in any other way. The old mode of using it was painful in the extreme, and, carried out for years without the merciful aid of anæsthetics, must have been enough to deter the surgeon from resorting to it. The entire of the base of the tumour was tightly constricted with whipcord. We have then the improvement of Brodie and others, who transfixed the neck of the tumour and tied it in segments. Bushe, of New York, has recommended some ingenious instruments for this purpose, but if you desire to practise it the modern plan will be found more efficient and very much less painful. The patient having been duly prepared and the legs secured in the manner directed for all these operations, the sphincter should be paralysed by stretching with the fingers. This will encourage the protrusion of the hemorrhoids, and facilitate immensely the future steps of the operation.

The tumour which is to be subjected to operation should be caught by a tenaculum, vulsellum, or the hook designed for the purpose, and given in charge to an assistant, who draws it down steadily. With a short, straight scissors the pile should be separated from its connexions with the muscular and submucous tissue, upon which it rests, to such an extent that it shall be connected by an isthmus of mucous membrane containing the large vessel which supplies it with blood. Around this a strong ligature well waxed should be slipped to the very summit and there securely tied. The extremity of the pile and the ligatures may be cut off, but care must be taken to leave enough of both to prevent the knot from slipping. It may be necessary, by a second application of the scissors, to detach the pile from an adjacent tumour, so as still more to narrow the pedicle to be tied. To properly aid you a little dexterity is required of your assistant. Having the tumour well secured in the pronged hook, he should first draw it away from the wall of the bowel towards the anal opening, to admit of the due application of the scissors to the groove which separates the pile from the margin of the skin. When the ligature is lodged deeply in the incision the hook should be rapidly passed to the other hand, and the pile now drawn in the opposite direction, so as to facilitate the knotting of the ligature over the pedicle of mucous membrane. As to the best material to use for this purpose there is some difficulty. I have seen a patent platted silk cord used for this purpose, and which had great strength when simply stretched, break off at the second knot—a very awkward occurrence. Whipcord answers well, but I have found nothing to equal three strands of common shoemakers' hemp gently twisted and then well rubbed with shoemakers' wax. This will bear any strain; the first knot will remain fixed until the second is tied; it will not crack across at the knot, and it is not permeable by the fluids of the intestine.

Several tumours may be thus dealt with in detail. A piece of ice may be passed into the bowel, and a light dressing of absorbent cotton or fine tenax secured by a T bandage. In the evening the dressing should be changed, and a morphia suppository introduced. The bladder should be carefully watched, as retention of urine is likely to follow this or any operation on the rectum. If possible the bowels should be kept from acting for two or three days. The knots separate and are discharged in about eight days. It is desirable that the patient should be confined to a sofa for about a fortnight after the operation, but they sometimes feel well enough to go about and transact business.

Dr. Bodenham, of New York, objects to the drawing down of the pile and to the incision. He regards the lining membrane of the bowel as highly sensitive, much more so than the piles themselves. He therefore advocates tying the tumour with a soft silk ligature with sufficient tightness to diminish the circulation — not to strangulate it. I cannot think this recommendation of any practical value.

This operation has been impugned on the ground of being painful, tedious, and especially exposed to the danger of tetanus. With the full use of anæsthetics, which it is your bounden duty to offer to your patient in every such proceeding, the objection on the ground of pain must disappear. The operation is no doubt tedious in its results, and the convalescence involves some loss of time, which, in this age of rapid progress, might be a consideration which would weigh with some persons of excitable temperament.

The objection that the operation is liable to be followed by tetanus is an interesting piece of surgical history. Mr. Curling records that in the spring of 1858 no less than four of the cases operated on by deligation at St. Mark's Hospital, London, were rapidly followed by this fatal disease, causing a great shock and bringing the operation into disrepute. It is, however, a well-known matter of history that during that same season there was an epidemic of tetanus, many cases having occurred in other hospitals and following operations of various kinds. Now I have seen enough of this dreaded malady to convince me that it is greatly influenced by atmospheric and other climatic conditions. I remember in 1878-79 we had several cases of tetanus in our accident ward, and I believe its frequency at that time was also observed in the other hospitals of this city. Since then we have had no case of the disease. Thus we see that the application of ligature to piles is not in the least more likely to be followed by tetanus than any other surgical operation. I have heard it stated that abscess in the surrounding areolar tissue is a source of danger after the operation, but no operation here is free from that risk. I believe the ligature has never been a favourite operation in the Dublin hospitals for the treatment of internal piles.

Ecraseur.—In the management of a large number of cases of internal piles I have found the *ecraseur* most useful, being quick, manageable, and convenient. Without anæsthetics it is undoubtedly painful, but they may be used with advantage and safety. In the Dublin Quarterly Journal of Med. Science for May 1864, I ventured to draw the attention of the profession to the advantages of this mode of treatment, and nothing that I have since seen has changed my opinion as to its great value in the majority of cases which we meet with in the early stage of the disease.

The sweeping denunciations which have been uttered against this mode of treating piles by some authors of high practical character have created a strong prejudice against its employment, and tended much to restrict its fair trial; though for some time biassed by these opinions, more matured experience and extended observation have convinced me that were the merits of the ecraseur to stand on this one application to the purposes of practical surgery, it would be fairly entitled to a place in our *armamentaria chirurgica.* Mr. Ashton thus stigmatises the instrument:—"Another plan for the removal of hemorrhoids and other growths emanated in Paris, and became a fashion for a time, but happily, in England, at least, is now little practised. I allude to their ablation by that crushing, lacerating, and unscientific machine, the ecraseur, which in appearance and operation suggests the idea of belonging rather to the torture chamber of bygone days than of being an instrument of modern surgery. M. Nélaton reports that many who have been operated on by it are now the victims of traumatic stricture of the rectum." Mr. Curling objects to its use, as being sometimes followed by hemorrhage; being tedious, and being likely to be the cause of contraction of the anal aperture.

To claim for the ecraseur that its operation is always free from untoward results, would be to assert what is equally untrue of the ligature—of every surgical appliance to which we resort, as well as of everything human—but I am fully satisfied that under impartial trial in cases to which it is not inapplicable, it will realise a fair amount of success.

The preliminary arrangements so frequently insisted upon having been carried out, the pile should be seized with forceps or multiple hook and well drawn through a loop of the chain of the ecraseur, which should now be tightened steadily, but very slowly, until the pedicle is cut through. It occasionally happens that the mucous membrane remains entangled in the slot of the instrument. It should not be pulled off or cut, but detached by torsion, which completely guards against the danger of bleeding. The ice and cotton dressing may now be applied, to be followed after some hours by the morphia and belladonna suppository.

Caustics.—The repugnance which some individuals have to every kind of cutting operation and the risk of hemorrhage led surgeons to resort to caustics of various kinds for the relief of piles. We will first speak of the potential cautery. Of these nitric acid takes the most prominent position, and has been strongly advocated by the Dublin surgeons. We find in our old hospital case-books some records on this subject of great interest. We have a number of cases in which Mr. Cusack applied the nitric acid to these growths with success; but where the tumour was of large size the acid was applied to it only partially, the result being that, when the slough separated from the vascular tissue of the pile, hemorrhage invariably supervened, and in some instances to an alarming degree. When this occurred Mr. Cusack was in the habit of using actual cautery, for the application of which he devised irons of various shapes. The results are reported as highly satisfactory. These cases show us that thick fleshy piles cannot safely be treated with potential caustics. They do not exert their influence to a sufficient depth to offer security against hemorrhage when the eschars are being detached.

For the vascular tumour of the rectum, the nævoid pile, Mr. Houston has insisted on the value of nitric acid, and this practice has received the sanction of almost all surgeons for this special variety. The mass being made to protrude at the anus, the surface immediately surrounding the pile should be coated with olive oil. The surface of the tumour should be touched with a stick dipped in nitric acid until it assumes an ashy gray colour. Oil should then be applied and the parts returned. I have used the following modification of potential cautery for a single tumour:—Take a common surgical needle, and, having some nitrate of silver melted in a porcelain capsule over a spirit lamp, coat the needle with caustic to within a line or two of the point, which should be left clear for the purpose of piercing the pile, which should be transfixed. The caustic thus melts in the interior of the mass and causes its consolidation. On the same principle I have seen them injected by means of a hypodermic syringe with a solution of perchloride of iron or of ergotine. The injection of iron-salt into vascular or nævoid tissue has been followed by fatal embolism. Carbolic acid has also been suggested for this purpose.

Clamp and Cautery.—The treatment by the actual cautery, as practised by Cusack, Lee, and Henry Smith, is, beyond doubt, a safe, sure, and most thoroughly effective means of dealing with the disease. We have seen that Mr. Cusack first resorted to it as a means of controlling the bleeding after the use of nitric acid, but subsequently adopted it as a primary operation —piercing the pile with pointed cauteries resembling these now used for nævi, at other times using a clamp guarded with wet chamois leather. I think we are indebted to Mr. Henry Smith for having established this mode of treatment on a sound surgical basis. This operation with the clamp and cautery you have often seen in use in the hospital in severe cases of piles. The patient having been prepared and placed in the proper surgical position and the sphincter stretched, the tumour having been protruded, one of the piles is to be grasped in the usual way with tenaculum or forceps, and drawn well down; it is then caught between the blades of the clamp. The blades are protected with ivory, so that, should they become heated by contact with the hot iron, they will not burn the adjacent parts. You should further observe that the blades are fitted with a spring to open them, and a screw to keep them closed. For ordinary operations I have found it advantageous to have them narrower and thinner in the blades than those usually sold at the instrument makers. The pile having been adjusted within the blades, they are to be screwed home. The portion which projects beyond the forceps should be cut off with a knife or scissors. In doing this you must be careful not to cut off the entire of the tumour on a level with the clamp. If you do so the tumour may slip from it in the next stage of the operation. The cut surface should now be wiped dry, and the cautery at black heat almost, but not red, should be lightly passed over the cut surface. You must never forget that for staunching bleeding you should use only black heat; for destroying tissues, you must apply it red or white. You have in the *thermo-cautery* of M. Paquelin, which is now used in this and every hospital, a beautiful application of science to surgery. By it you can regulate the amount of heat with the most extreme delicacy. You have often seen used here for this purpose a scissors heated by this instrument, by which the cutting and searing are simultaneously performed. The blades of the clamp should now be carefully relaxed a little by a turn of the screw to see if there is any bleeding. Should such exist the instrument must be at once screwed up again, and the bleeding point touched with the hot iron. In this way the several tumours may be dealt with in detail. The bowels may not be acted on for a day or two, and when they are about to move, the injection of an ounce of olive oil from a gum elastic bottle will facilitate their action and diminish pain.

Crushing.—A mode of operating by clamp only has been recently introduced into practice. This clamp has been constructed by Mr. Benham, to carry out the treatment of Mr. G. D. Pollock of St. George's Hospital (*Retrospect*, vol. 82, p. 166), by whom it is approved and used. Without enumerating other advantages, it is pointed out that it so completely crushes the pile, as to leave only a slight fringed remnant, without any pain or bleeding, rendering the convalescence of the patient a matter of a few hours. The patient suffering from hemorrhoids, being prepared for the operation in the usual manner, is placed under the influence of an anæsthetic. He is then turned on his left side; the right leg is well flexed and fixed with a strap, which is carried under the knee and round the neck. The pile to be removed is drawn well down by pronged hook or forceps. The clamp is applied to the base of the pile, and at once tightly and firmly closed by the action of the screw at the end of the handles. The portion of pile which protrudes inside the lips of the clamp is then removed by a pair of curved scissors or an ordinary scalpel. The clamp should afterwards be retained, still grasping the remnant of the pile, for about two minutes. If, after removing the clamp, there should be a slight oozing from any point of the fringed remnant, this may readily be arrested by the application of the torsion-forceps or a fine ligature (this process is, of course, to be repeated according to the number of masses to be got rid of). The dressing employed after the operation is completed is usually tarred cotton, or that prepared with salicylic acid, with warm bathing.

My experience of this instrument has not been sufficiently extended to enable me to express a competent opinion on its value, but from what I have seen of it, and juding of its *modus operandi*, I regard it as likely to come into use as an addition to our means of dealing with large hemorrhoidal tumours; and Mr. Allingham, the distinguished surgeon of St. Mark's, London, who has given it a trial in a great number of cases, has expressed to me a very favourable opinion of its merits. It is rather a formidable-looking implement, very heavy and cumbersome; it resembles a carpenter's pincers, capable of being closed by a powerful screw, but perhaps more powerful and thorough in its action than lighter and more toyish instruments.

Mr. Martin Coates, of the Salisbury Infirmary, in the address on Surgery at the late meeting of the British Medical Association at the Isle of Wight, has proposed a cutting operation intended to avoid the pain of strangulation, sloughing, burning or crushing, and aims at a simple incised wound to be closed by suture. The pile is seized in a dentated clamp of original construction; a number of catgut sutures are passed through the tumour beneath the clamp; the piles are now cut off superficial to the clamp, and the wound closed by tying the threads. Carbolic dressings are now applied. This operation has not yet received the stamp of any extensive experience. It appears over-weighted with a number of special instruments, and we could hardly expect that such a wound would easily accept primary union. The unceasing movement of the parts, the constant moisture, and the liability of the fine stitches to soften or cut their way through, are conditions inimical to immediate union of such a wound, however carefully brought together, and it is almost too much to expect that antiseptic surgery should triumph over such insurmountable obstacles.

Of the different modes of operating I consider the clamp and cautery the best for you to adopt for general use. It is manageable, almost free from risk, and I think the stimulus of the hot-iron with the subsequent contraction affords the greatest immunity from a return of the disease.—*Dublin Journal of Med. Science, May* 1883, *p.* 437.

ORGANS OF URINE AND GENERATION.

43.—ON CYSTOTOMY, BY A MODIFIED LATERAL METHOD IN CERTAIN CASES OF ENLARGED PROSTATE.

By Reginald Harrison, F.R.C.S., Liverpool Royal Infirmary.

Within recent years, I have had cases where it has been found expedient to make an opening into the bladder from the perineum, in preference to other measures, the usual means of relieving obstructed micturition, or the consequences arising therefrom, having failed or proving insufficient.

I may premise by stating that, apart from those cases of obstruction complicated with circumurethral abscess, no such proceeding has been undertaken on the sole ground that catheterism was impossible, though some difficulty connected with the performance of the operation has, with other circumstances, usually been present.

The selection of a method for opening the bladder should have reference only to the object to be attained, or the contingencies that may arise. If, for instance, we desire merely to introduce the finger into it; as a preliminary to extracting a small stone, the median operation answers perfectly; whilst, if a larger stone, or an unknown quantity of anything, has to be dealt with, the lateral incision will, as a rule, be preferable.

It has been advanced by those who favour the median incision, which is practically an urethrotomy, that it is both simple and safe; its admitted disadvantage lies in the comparatively small space it provides for manipulating and extracting; whilst, on the other hand, the lateral incision, though affording more room, is considered to be attended with an increased risk and a greater degree of difficulty, so far as its performance is concerned. The median operation need not necessarily involve anything more than the opening of the membranous urethra. The completed lateral operation further includes the division of structures constituting the neck of the bladder; and it is to this part of the proceeding that any increased risk or difficulty is to be attached.

A little reflection shows that it is possible to closely assimilate the lateral with the median operation, that is to say, to dispense with the incision, not to the staff, but along the staff, should it be found, on exploration with the finger, that the additional room which the latter part provides is unnecessary for the object in view. It need hardly be said that this modification of the lateral method, where it is found, on digital exploration, to be feasible, frees the operator from executing the only portion of the operation to which any increased risk is attached; whilst, on the other hand, he has the consciousness that, should it turn out to be necessary, he can, by the completion of the deep incision along the staff, avail himself of all the advantages which are conceded by surgeons to the lateral method of opening the bladder.

In the following case, effect was given to these considerations, as I had it in view that it would be possible not only to afford a temporary relief by draining the bladder from the perinæum; but, further, I might find it feasible, as I have done before, to remove the whole, or a portion of the obstructing prostate, in the form of a pendulous lobe or of an adenoma, which could be enucleated with the finger.

M. L., aged 63, was admitted into the Royal Infirmary on February 16th, 1883. For nearly three years he had been suffering from frequent micturition, caused by an enlarging prostate. For the last month, the irritability had so much increased, that he found it difficult sometimes to hold his urine for more than ten minutes. The straining and forcing to micturate had induced a considerable prolapse of the rectum. Catheterism had to be frequently employed.

On his admission into the infirmary, the patient was in a feeble condition from want of continuous sleep, by reason of the state of his bladder. His tongue was brown and furred, and there was the usual urinous smell about him. The urine was offensive, and largely charged with blood, which escaped more or less continuously from the urethra, and was excessively increased every time the catheter had to be used. The usual means for dealing with this condition were resorted to, but with no benefit.

On February 24th, I had the patient brought into the operating theatre, and in the course of some clinical remarks, pointed out to the class the absolute necessity for adopting other means than those usually employed in less urgent cases of this kind. The cystitis and hemorrhage, which were directly connected with the prostatic enlargement, were both likely speedily to occasion a fatal termination.

Recognising the necessity, at this period of the case, of placing the bladder at rest, and rendering the use of the catheter unnecessary, I expressed my intention of making an opening into the bladder by the lateral method, as already described. The patient being placed under ether, and in the lithotomy position, I introduced a small grooved staff into the bladder, and made a limited incision down upon it laterally, opening the urethra in the membranous portion. The staff being necessarily a small one, I was enabled to pass my right index finger into the bladder without removing it. On doing so, I found that. though the prostrate was not very large, the orifice of the bladder was obstructed by one of those nipple-like enlargements of the third lobe, which are sometimes more effectual in rendering micturition difficult and catheterism uncertain, than more general hypertrophies.

Finding that I could obtain my object and free the neck of the bladder without attempting to remove or enucleate any portion of the gland, I did not carry my incision into the bladder along the groove of the staff, but introduced on my forefinger (having now removed the staff), a straight, narrow, probe-pointed bistoury, by which I divided what seemed to me to be the obstructing portion of the prostate. I then found that my finger entered the bladder easily, whereas previously it was with the sensation that a source of obstruction existed, which was quite capable of rendering catheterism difficult. I should add that, on again using my knife for the purpose of slightly enlarging the superficial incision to avoid bagging, the rectum, which had been accustomed to prolapse very much, suddenly filled the wound, and came into contact with my knife; a small puncture of the bowel was the result. I ought to have avoided this, but, curiously enough, I am disposed to think, as I shall presently mention, it proved a not unimportant feature in the case.

A lithotomy-tube was introduced, to which a rubber tubing was attached for draining and keeping the patient dry. The operation was followed by a rapid cessation of the hemorrhage and a decline of the cystitis. On the third day after, it was reported, "Patient in good condition; sleeps and eats well; pulse 80; temperature has never exceeded 100° Fahr." On March 15th, the report states, "Wound looks healthy; appears to be closing up; passes his urine mainly through it; some by the urethra." At times, a little fæces made its way into the wound, escaping through the perineum. The amount was so small as not to occasion any inconvenience, whilst it proved to be an obstacle to the speedy closure of the incision into the bladder. Within eight weeks from the time of the operation, the patient was able to leave the infirmary.

On June 1st, he returned for the purpose of getting some advice for dyspepsia, when I took the opportunity of examining him. In the perineum, there was still a slight fistulous opening remaining at the lower angle of the wound, through which urine sometimes passed in drops during micturition. The patient could now hold his urine for several hours; the urine was normal. On examining the prostate from the rectum, some slight enlargement could be felt. A full-sized catheter was easily introduced into the bladder, without any hitch or obstruction, in the prostatic urethra, or at the neck of the bladder, being experienced.

I do not think there can be any doubt that the operation not only saved the life of the patient, but has considerably added to his comfort. Though the use of the catheter has been abandoned, I have advised its occasional employment, in accordance with the views I have advanced relating to the early treatment of prostatic hypertrophy.—*British Medical Journal, June* 9, 1883, *p*. 1110.

44.—ON THE SURGICAL TREATMENT OF TUMOURS AND OTHER OBSCURE CONDITIONS OF THE BLADDER.

By Walter Whitehead, F.R.C.S.E., F.R.S.E., Surgeon to the Manchester Royal Infirmary; and
Bilton Pollard, M.D., B.S., F.R.C.S., Resident Surg. Officer.

The papers communicated by Sir H. Thompson to the Medico-Chirurgical Society on this subject and on digital exploration of the bladder (see *Retrospect*, vol. 85, p. 223, and vol 87, p. 301) entitle him to the credit of having popularised an operation which had previously been confined to the practice of a few surgeons, and which hitherto had not been recognised in any of the standard works on surgery. This operation, having now received the sanction of a surgeon of such unquestionable authority and such unrivalled experience as Sir H. Thompson promises to open out a fresh field for cultivation in surgery, and a new sphere for affording relief in cases which hitherto have remained unrecognised and unrelieved.

The operation of opening the urethra in the membranous portion in cases of impassable stricture and cases of retention is an operation long familiar to all practical surgeons; but when it is performed for the similar purpose of investigating obscure diseases of the bladder, and with the prospect that some condition may be discovered amenable to operative relief, we recognise an idea, the full valuable significance of which does not appear to have been fully realised by anyone before.

With the object of contributing to this important subject, we propose to record a number of cases which have come within our immediate knowledge in public and private practice, and to draw attention to certain points which have forcibly arrested our attention in the study of these cases.

Previous to relating the cases, it has seemed advisable to give a brief *résumé* of the more salient pathological features of bladder tumours, and shortly to refer to the means at our disposal for arriving at a diagnosis of their presence and nature.

Tumours of the bladder may originate primarily in its walls, or may extend to them secondarily from neighbouring parts, such as the uterus, rectum, or pelvis.

With the secondary growths we are not at present concerned. As regards primary growths, the bladder, we must remember, being developed from hypoblast and mesoblast, is, according to the blastodermic theory of tumours, able to originate epithelial growths as well as those of the connective tissue, muscle, nerve, and vessel types. The bladder is constructed of connective tissue and muscular walls, and is lined internally by a stratified epithelium, developmentally sprung from hypoblast. The mucous membrane has no papillæ on its surface, but it contains, particularly towards the neck of the bladder, some racemose glands. Each of these tissues, theoretically, may be the seat of tumours common to them in other situations. The connective tissue may give rise to growths of adult or embryonic connective tissue (fibroma, mixoma, enchondroma (?), and sarcoma); the muscle to myoma, the epithelium to epithelioma, and the gland epithelium to carcinoma. Experience fully bears out these theoretical considerations. Enchondroma is added to the list on the authority of two cases, one published in the Gazette Médicale de Paris, 1836, the other communicated to the Société Anatomique; but it is considered probable by Cornil and Ranvier that in the latter case the bladder was secondarily implicated, the tumour having originated primarily in the pelvis. In this enumeration the most common tumour is omitted, that is the so-called villous tumour. The villous tumour consists of numerous simple or brauched processes springing from the submucous connective tissue; each process is composed of connective tissue in very small quantity, supporting fine blood-vessels, and is covered with a thick layer of epithelial cells; the submucous connective tissue from which it grows does not show the least trace of pathological tissue. The term villous has been derived from the naked-eye appearance of the growth, and has, of course, no pathological significance. These tumours have from time to time received various names; but of these the term papilloma appears to us the best. This view is open to the criticism that there are no papillæ normally in the mucous membrane of the bladder, and that these villous tumours spring from the submucous connective tissue, and that consequently they have more affinity with fibromata; but in their typical form they consist simply of vascular loops supported by connective tissue and covered by epithelium—a structure exactly corresponding to normal papillæ—and therefore to be regarded as a true papilloma of new formation. On the other hand, all tumours with a papillated surface are not papillomata; the point of distinction in these cases is found in the base of the growth; if, for instance, the base be distinctly fibrous, the tumour is most correctly termed a papillary fibroma; if, on the other hand, it be sarcomatous or epitheliomatous, the tumour is a papillary sarcoma, or a papillary epithelioma. So common is the papillation of the surface of all bladder tumours that this feature alone is of no importance in deciding the true nature of the growths. In connexion with this great tendency of the bladder to form papillæ, it is interesting to recollect its origin from the allantois, and to bear in mind that it is from the latter that the vascular portion of the chorionic villi are produced, for we have in the chorion the most typical papilloma, occurring as a physiological structure. So great is the tendency for bloodvessels of the submucosa to shoot out in a papillated form, that in sarcomata springing from this situation it is sometimes possible to detect a strikingly arborescent arrangement of the bloodvessels in their substance. The term polypus has often been applied to bladder tumours; indeed, Hutchinson proposed to call these villous tumours villous polypi, from the fact that the majority were pediculated, but a title based on such a feature would be very unsatisfactory, as the polypoid condition has no pathological significance, and all forms of bladder tumour may take on the polypoid formation. True, cystic growths in the bladder are, so far as we are aware, unknown; there is, however, a reference to a cyst of false membrane which was removed by Liston by suprapubic cystotomy, the cyst being the shape of the interior of the bladder. The following list shows eight histological varieties of tumours which have been recognised as having their origin in the human bladder:—(1) Fibroma, (2) myxoma, (3) sarcoma, (4) myoma, (5) enchondroma, (6) epithelioma, (7) carcinoma, (8) papilloma.

Villous growths (papillomata) rarely exceed the size of a hen's egg. They may either be sessile or pediculated, round or ovoid. They have a soft consistence and a rosy, sometimes yellowish, appearance. Immersed in water, they swell and send out floating filaments and branches resembling a sea anemone. The branches sometimes exceed two inches in length. The most common locality in the bladder for these growths is within the trigone, and the vicinity of the urinary orifices their most favoured site—situations which render them very liable to become impediments to the flow of urine, and, by causing repeated attacks of obstruction, lead eventually to hypertrophy of the muscular coat of the bladder, dilatation of the ureters, and ultimately hydronephrosis. The epithelial covering of villous growths being thin, friable, and easily removed, and, being subjected to the varying conditions of the bladder, it can readily be conceived how the contained vascular loops become exposed and injured, and, in consequence, give rise to hemorrhages of varying intensity—hemorrhages which, in the past, have almost invariably cost the patients their lives in from three to four years. The urine of patients suffering from villous growths within the bladder is neither influenced in quantity nor specific gravity, but almost invariably contains blood either constantly or at infrequent intervals. As may be supposed, the presence and quantity of blood are governed by certain circumstances, amongst which may be mentioned violent exercise, when the blood will be fairly equally distributed in the urine, and give it a uniform red colour, straining at stool, and at the termination of micturition, in which case the urine may be free from blood at the commencement of making water, but deeply tinged at the conclusion. The introduction of catheters is also frequently followed by hæmaturia.

The principal aids to the diagnosis of tumours within the bladder are as follows:—1. The detection in the voided urine of minute tufts which from time to time become accidentally detached from the parent growth. These tufts can be microscopically identified as branched villi, with central capillary loops covered with one or several layers of epithelium. 2. Catheterisation with the intention of entangling in the eye of the instrument fragments of the villous growth. 3. Exploring the surface of the bladder by means of a sound, in order to detect any irregularity in the surface of the vesical wall. 4. Bimanual palpation. 5. Digital exploration of the bladder.

The urine at times contains coagula, and occasionally detached fragments of the villous branches may be recognised. The latter, when detected and examined under the microscope, afford the most conclusive and satisfactory evidence of the nature of the case. In Mr. Berkeley Hill's case, published in the University College Hospital Reports for 1880, it is stated that bits of tissue, showing the nested arrangement of epithelium characteristic of epithelioma, were detected in the urine; any observation of this nature of course renders the diagnosis of epithelioma a certainty. Beyond the information afforded by an examination of the urine additional knowledge may be gained by the use of a full-sized metal catheter, provided with large eyes. The bladder should be examined when fully distended with urine, and the growth freely floating in its contents—the branches follow the flow of urine, and becoming entangled in the openings into the catheter, are torn off during the removal of the instrument.

It is necessary to offer a word of caution against the indiscriminate, or rough use of catheters for diagnostic purposes in suspected cases of villous growths. In the first place, septic contagion may be introduced into the bladder and cause troublesome catarrh. Fatal hemorrhages have followed the use of the catheter in such cases. Examples are mentioned by Cruveilhier, Leudet, Tufnell, Rendu, Langlebert, and Guyon.

In addition to the value of the catheter in procuring fragments of the growth for purposes of diagnoses, further knowledge may be gained by its use. A sensation is conveyed by the catheter as though the end was moving through a mass of floating hair, or in a spongy substance, or on a velvety or woolly surface.

The examination of the bladder by bimanual palpation is frequently of great value as a diagnostic agent. Simon recommends in female subjects the introduction of the index finger into the previously dilated urethra and the middle finger into the vagina, whilst the other hand depresses the vertex of the bladder downwards towards the index finger, by this means a complete exploration of the bladder can be made in the majority of cases. Volkmann recommends that in male subjects, when they are under the influence of chloroform, one finger of the left hand in children and two in adults should be introduced as far as possible into the rectum, whilst an assistant presses both his hands flat above the symphysis in the hypogastric region, forcing the bladder towards the surgeon's fingers. By this means, in lean persons, with empty bladders, and without enlarged prostate, the vertex of the bladder may be fully examined. When the surgeon detects any pathological change, he glides his right hand below those of his assistant, and by this means he transfers the morbid part of the bladder entirely between his own hands, which permits a more trustworthy opinion to be formed.

Digital exploration of the bladder is the final and most certain method of arriving at the diagnosis; in the female there are no difficulties in the way, for the short and easily dilatable urethra offers but little impediment to a thorough exploration of the interior of the bladder with the forefinger.

It is with the idea, as Mr. Lund stated at the meeting of the Medico-Chirurgical Society, of approximating the anatomical condition of the male to that found in the female, that the operation of opening the membranous urethra has been advocated in these cases, as by this means the same facility in exploration of the bladder is obtained for the male as that which exists in the female. Certainly in a number of cases this is perfectly true, but it is also a fact that in others it is by no means so, for there are at least two anatomical conditions that facilitate the digital exploration of the bladder in the female—they are the absence of the prostate, with its frequency of enlargement, and the wider pelvic outlet. It has been stated by Sir H. Thompson that digital exploration of the male bladder through an opening in the membranous portion of the urethra is always possible if the patient be thoroughly anæsthetised and the bladder be emptied. This is a statement which we consider requires qualification, for there are at least three conditions which may prevent such a complete exploration: they are:—1. Stoutness of the patient, by which the depth of the perineum is much increased. 2. Enlargement of the prostate, by which the bladder is pushed further from the surface. 3. Considerable narrowing of the pelvic outlet, which prevents the hand being well pushed into the perineum. Case 3 is an instance of the mere corpulence of the patient preventing an exploration of the bladder; but when, in addition to stoutness of the patient, the prostate is also enlarged as in Case 9, a thorough examination is quite impossible. In this case the patient was deeply under the influence of chloroform, and the suprapubic pressure rigorously employed, yet three surgeons, with forefingers of quite the average length, pronounced exploration of the bladder to be absolutely an impossibility.

In the absence of these conditions, however, a complete exploration of the interior of the bladder can unquestionably be made by the tip of the forefinger introduced through an opening from the perineum into the membranous portion of the urethra.—*Lancet, October* 6, 1883, *p.* 582.

45.—ON THE RADICAL CURE OF VARICOCELE.

By Richard L. Pinching, M.R.C.S.E., San Francisco.

Mr. John Duncan, Surgeon to the Royal Infirmary, Edinburgh, remarks:—"The treatment of varicocele always presents a certain difficulty to the surgeon. This disease is not dangerous to life, nor does it seriously interfere with ordinary functions and avocations; but it is a source of harassing if not severe pain, is a matter of solicitude to the patient, and in some cases leads to wasting of the testicle. The former considerations have led some to recommend palliation by suspension, the vein-truss, and the cold douche; while the immense number of operative measures which have been devised, and which are not devoid of danger, bear witness to the importance of the latter." Mr. Duncan adds—"In the subcutaneous ligature by catgut we have a means of meeting the difficulty." (*Retrospect*, vol. 84, p. 514.)

As to the many operations on the spermatic veins I would recommend those who are interested in the subject of the treatment of varicocele to an exhaustive article on that subject by Mr. Royes Bell, Surgeon to King's College Hospital (*Retrospect*, vol. 85, p. 235), from which the following extracts have been taken:—"Sir Astley Cooper, who thought so lightly of the disease, was induced in some cases to perform a severe and uncertain operation for its cure—namely, excision of a portion of the scrotum. Mr. Key actually removed a testicle for a painful varicocele. Sir W. Fergusson cured a varicocele by thrusting a red hot awl into the veins when requested by the patient to remove his testicle. Sir A. Cooper and Sir B. Brodie both discarded the old operation of cutting down on the veins and tying them, as it was attended by phlebitis and death." "The saying that history repeats itself is undoubtedly true of surgery; for some surgeons isolate the veins selected for obliteration by dissections, tie them in two places with carbolised catgut, and divide them between, operating with antiseptic precaution."

I have shown in these extracts the views of other surgeons of highest reputation with respect to the radical cure of varicocele, the palliative plan of treatment, the old operation condemned by Sir A. Cooper and Sir B. Brodie, and a modification of the old operation condemned by the leading surgeons of the present day.

About five years ago I was consulted by a young man in this city (San Francisco) who was suffering from varicocele of his left testicle. I recommended the palliative treatment at first. After a short time, finding that he was deriving no benefit from it, he asked me if I could not permanently cure him, or, as they say in America, "I want you to cure me *right-away;*" for, if *I could not*, he would rather put an end to his existence. It just occurred to me that I had read an extract in the Dublin Journal of Medical Science, from the pen of Dr. William Colles, Surgeon to Steevens' Hospital, Dublin, in which he recommended the subcutaneous injection of the liquor ferri perchloridi as a radical cure for piles. It struck me at once that this was the remedy for the radical cure of varicocele. I took the initiative on the moment, and suggested the operation to my patient, who at once consented to it. I found there were two large bunches of varicose veins, one in front of the epididymis, and the other higher up in the spermatic cord. I selected the latter situation, and injected ten minims of liquor ferri perchloridi with a subcutaneous needle, placing half a sliced potato between the spermatic cord and the groin to protect the needle and steady the cord. I then plunged the needle, previously charged, through the bunch of varicose veins into the sliced potato, and then, withdrawing the point of the needle into the centre of the varicose veins, I injected the contents of the syringe. Immediate effusion took place into the areolar tissue, which became quite tense and very painful, so much so as to cause syncope, and he was not able to leave my office for home for some considerable time; nevertheless he was able to resume his usual occupation the following day, and the ultimate result was a radical cure of his varicocele. I have seen him repeatedly since the operation, and there is no symptom of a return of the disease; the testicle has assumed its normal condition and solidity; there remains a hard cord from the agglutinated veins, which appear to be quite obliterated.

Were I to perform the operation again with the liquor ferri perchloridi I should first place the patient under the full power of chloroform, injecting subcutaneously at the same time the solution of morphia, so as to keep him under its influence for some time after the operation.

Some time after this I had two other cases of varicocele, and in these I used an injection subcutaneously of strong tincture of iodine with the same good results, and the pain caused was trifling compared with that caused by the solution of iron. These two patients were able to resume their different occupations the following day, simply using a suspensory bandage as a protection. I should have mentioned that the subcutaneous injection of the tincture of iodine produced considerable effusion into the spermatic cord and areolar tissue likewise.

I shall leave the adoption of this treatment for the radical cure of varicocele in the hands of the profession, and especially to hospital surgeons, who have more opportunities of testing this mode of treatment than the general practitioner; at the same time this is the safer operation for the latter, and, moreover, it is eminently the "tuto, cito, et jucunde" operation for the radical cure of varicocele.—*Dublin Journal of Medical Science, May* 1883, *p*. 401.

AFFECTIONS OF THE SKIN.

46.—ON THE TREATMENT OF ECZEMA AND OF PEMPHIGUS.

By JOHN KENT SPENDER, M.D.Lond., Physician to the Mineral Water Hospital, Bath.

Let us look at the morbid process called eczema, and try and study it without the trammels of academic formula. It is simple clinical truth when we delineate four grades of inflammatory action, which may be characterised as follows:—(*a*) the powdery desquamation of chronic passive erythema, or so-called *pityriasis*; (*b*) the active papillary hyperæmia, with enormous exfoliation, which constitutes *pityriasis rubra*; (*c*) the serous exudative inflammation which is called *eczema rubrum*; (*d*) the purulent exudative inflammation which has been known under the names of *impetigo* or *porrigo*. Now are not these conditions bound together by an obvious pathological link? and if so, we should speak of them as dry and moist forms of inflammatory action, instead of borrowing titles for them from ancient languages, puzzling to the student and the unripe practitioner. Surely the last two forms ought to be bracketed together, for they differ only in the fact that the serum of the one has become pus in the other, owing to a more intense local action or a lower tone of general health. Essentially the process is the same; but underlying all the phenomena there must be a special vulnerability of skin, or readiness of the skin to be irritated. This may be developed to such a high degree that the skin seems a battlefield for neurotic energies and humoral poisons, almost justifying the new institution called a "dartrous diathesis."

I will speak now of the treatment of two forms of dermatitis (*eczema rubrum*, and old dry eczema), a subject which has had my attention for some years. My experience is drawn chiefly from cases in private practice; and these are often difficult to manage successfully, for the medical attendant must do a great deal himself, and spare no time and trouble in superintending the smallest details.

The case of Miss M. furnishes a text for discussing the best way of managing *red catarrhal dermatitis*. She came to Bath in November, 1880, and had been under the care of Dr. Liveing during the previous summer in London. On her arrival here an old spotty eczema which she had long suffered from was confined to the legs, on which were many small irregular patches, sometimes a little hot and irritable. The general health was unsatisfactory. There was a history of old bronchitis; the constitutional tendency was distinctly gouty; and there was slight albuminuria. Much good was done by immersion twice a week in a tepid bath of the "Bath waters," and by the use of an excellent soothing application prescribed by Dr. Liveing, composed of vaseline and sweet almond-oil. She left Bath after a short stay, and returned at the end of 1881 with an outbreak of acute eczema as nearly universal as a skin disease can well be. There was much catarrhal bronchitis with emphysema, and the albuminuria was more marked. On the chest, abdomen, and back the eczema was weeping and irritable; on the thighs more inflammatory; and all over the legs the eruption was *eczema rubrum* in an almost malignant severity. Treating the disease on the upper parts of the body with vaseline and almond oil (the effect of which was incomparably good), the question was what were we to do with the legs?

Let me describe, firstly, two ways in which red weeping dermatitis ought *not* to be treated, although sanctioned by no mean authorities. Around a leg afflicted with this malady it was once the custom to lay strips of lint or rag soaked in an astringent lotion, and to put over these an impervious covering to keep them wet; yes, and the *leg* was kept wet too! For when after the lapse of a few hours the time came for a fresh "dressing," who can forget the steaming fetid mess in which the poor limb was bathed? Was there a possibility of healthy action being set up when we were stewing a leg in its own pathological juice (so to speak) by a method which is enough to render the most healthy secretion morbid? Almost equally bad is the sprinkling of a moist red surface with dry powders of any kind, for they cake into dirty lumps, and are therefore insufficient for any protective purpose. It is almost unnecessary to say that ointments spread on linen or lint are never to be thought of.

What remains, then, to be done? Coleridge speaks of a painting as an intermediate something between a thought and a thing. In like manner the point to be aimed at in the present case is the application of a *tertium quid*—not a powder, not an ointment, but something which combines the virtues of both with the drawbacks of neither. This aim is fulfilled by a soothing fluid which holds an astringent powder in suspension, and equally diffused through it. Take half an ounce of oxide of zinc, four scruples of the best calamine, a fluid ounce of glycerine, and seven ounces of lime water. Add a little lime water to the dry powders, and mix into a paste; pour in more lime water, and stir in a mortar until the ingredients are well mixed. Then put the whole into a bottle, and add the glycerine last. Before using, shake the bottle well, and pour a little of its contents into a shallow open vessel, as a saucer. Take strips of lint or linen rag from two to three inches wide, and of different lengths, to correspond to the different diameters of the limb. Soak them in the lotion, taking up on their surface as much of the powder as possible. Carefully adjust these medicated strips over the affected part of the limb; and then around all wind evenly and with gentle pressure a bandage made from a calico of open texture, like what is used by farmers as a covering for cheese. This process must be repeated at first every morning and evening, taking care that the strips are well moistened with warm water before removal, although the glycerine in the lotion prevents them from ever becoming quite dry. Commonly this plan succeeds very well; the skin gets softer and less moist, soon only one dressing in the day is required, and in cases uncomplicated with visceral disease a cure is speedily effected. But when we have to deal with limbs swollen from cardiac dropsy, and a vesicular *erythema læve* arising out of this, we cannot do more than afford temporary relief.

To return to my patient: Mr. Ollerhead, of Minehead, a former medical adviser of this lady, came up and met me in consultation while I was carrying out the treatment described above. When all acute local symptoms had subsided then a place was found for a combination of lead and zinc ointments, or a mixture of acetate of lead and oxide of zinc with cerate of petroleum, which soon produced a dry, soft, glossy skin. The eruption on the back and the abdomen had nearly faded when Miss M. left Bath, in February, 1882, much relieved in all respects.

Dry patches of *chronic dermatitis*, clearly eczematous in origin, are curable by the application of tar. But the tar must be weakened down by being mixed with astringent and soothing mineral powders. This is the essential qualification for the benign use of tar in any form of skin disease; and it is because this precaution has been often neglected that the external application of tar has been passed over and even disparaged. Of all the emollient materials proper to be mixed with tar, chalk is *facile princeps*. Finely levigated chalk should be strewed into melted lard in a stone jar, and thoroughly stirred until cold. Now the chemically antacid properties of this compound make it valuable, but it is of great utility as a medium of potent medicaments which cure by a specific property, *when used in a studied proportion, but irritate and inflame when that proportion is exceeded.* Now if the merest morsel of *Ung. Picis liquidæ* be added to chalk ointment, just sufficient to yield a brown smear of colour (and the eye is the best judge in such a matter), the infiltration and scaliness of an old dry dermatitis will gradually soften down; and, if assisted by the right auxiliary means internally, there will be nothing left in the long run but a pigmentary stain. In many cases the addition of a small percentage of *unguentum hydrargyri nitratis*, or of a few grains of the nitric oxide of mercury, is a material help. Do not these therapeutic facts show that one disease of skin-texture may glide into another? Subtle alliances of pathological kinship are suggested when we find that the remedy *par excellence* for the chief of squamous diseases may greatly alleviate the rough and almost ichthyotic specimens of infiltrated eczema which are met with on both extremities.

The late Dr. Tilbury Fox described an unusual form of *Lichen planus*, seen on the front and the sides of the leg. A patch may be as large as the palm of the hand; it is elevated, and feels and looks like a rasp, or a harsh warty growth. It is very amenable to local treatment.

And now let me say something about a case of an essentially neurotic disease, such as I believe *pemphigus* to be. It is not the fact of a disease being vesicular that makes it a neurosis; it must obey certain laws of coming and going, and show some orderly phenomena in its outward manifestations. The patient whose case has interested me so much during the last two years was born in February, 1862, and is the son of a Bristol merchant who resides in Bath; he wrote for me a careful history of his malady, and from it I make the following extracts. "In 1874 a few red spots first appeared on my hands, where, in about six days boils formed and filled with a clear watery fluid. These boils were pricked with a needle, and after a few days the under skin would thicken, and the outer skin dry and soon peel off, and I should be apparently well. From time to time these boils, which also formed about the lips and ears, broke out so often that they were considered as nothing extraordinary, and I was expected to grow out of them. A few bottles of mixture, such as were considered 'good for the blood,' were had of our family chemist. After my spots had appeared and disappeared a few times, our surgeon (we then lived in Cornwall) was consulted, and he was of opinion that I was in a growing state and had overheated my blood while playing football or cricket. He advised that I should not play or do anything that would heat me, and that I should keep in the same temperature as far as possible. The complaint was not kept away by the medicine which this surgeon supplied; the spots disappeared for a while always to come forth again. At times my fingers were so swollen that I could not hold a knife or fork; if in the summer I exposed my swollen fingers to the heat of a hot sun, the irritation would be intense; and if in the winter I exposed my hands to the cold all irritation was allayed, but it always returned when I went from the cold outer air into a warm room. About January 5th, 1881, my spots reappeared with great severity after a longer absence than usual, and I consulted the same surgeon who had seen me on previous occasions. He warned me from the first that I should apply no ointment or drug outwardly to allay the pain; his medicine, he said, was intended to bring the spots out. By the 16th of January I had endured great pain, and there were traces of spots so late as the 20th of February. After a very short interval the spots showed themselves again early in March, and on the 5th of this month I first consulted you."

The sequel of this story is soon told. Exactly a year afterwards, my patient reported that there had been "no outbreaks" at all: only a few spots had appeared at intervals, but not such as to keep him from office duties. In January, 1883, he again reported that except for a short period during the preceding

July, there had been no "spots" or "bladders" for a whole year; and he considered himself as "totally cured."

The treatment of this gentleman's disease was of the simplest kind. At first I applied to the fingers a combination of vaseline and lead ointment, adding subsequently a small proportion of *ung. hydr. nitratis dilutum.* But local remedies soon became unnecessary. Iron and arsenic were administered internally from the beginning, and with the best effect. Now and then these medicines caused an inconvenient alvine looseness; but from October 1881 to January 1883 they were taken daily with such regularity that if all the omissions were counted up they would not measure in time more than eight weeks.—*Practitioner, June,* 1883, *p.* 402.

47.—ON A NEW DRESSING FOR LARGE ULCERS.

By Archibald Pearson, M.D., Glasgow.

Some two years ago, I was called to see an old maiden lady with a large, dry, gangrenous ulcer on the shin of the leg, two inches above the ankle, nearly encircling the leg, and about four inches broad. After getting the sloughs removed, I used a lotion of boracic acid with lint, dressing in the ordinary way. I may mention that I could not get my patient to take the necessary rest which her case required—move about she would. The removing of the dressings, even with the greatest care, produced much pain.

I continued this style of dressing for about four weeks with no indication of healing. Seeing the great irritation produced by the very finest lint on removing it, I thought of trying something less irritating, such as some folds of Indian muslin moistened with boracic acid lotion next the ulcer, and over this, a fold of dry lint, on which I spread oxide of zinc ointment, over this again two folds of dry lint, and over all Mackintosh and bandage. I removed this dressing on the third day by a stream of water from a large teapot, and to my patient's delight she felt little or no pain. Previously, the removing of the dressings was her greatest dread. This kind of dressing I continued for about three weeks with considerable healing all round, and great relief to the patient's feelings. At this stage I laid aside the oxide of zinc ointment, and substituted boracic acid lint in *three dry folds*, retaining the muslin as before, next the sore, and covering all with Mackintosh and bandage. These dressings were allowed to remain for three days, and carefully removed under a stream of water, and latterly the sore was cleaned with boracic acid lotion before applying the dressings. This large and unhealthy looking ulcer was completely healed in about ten weeks from the time the dry dressing began. Since then

I have used the same style of dressing on smaller ulcers with like success.

Within the last few months I put this dressing through a crucial test. A little patient had the misfortune to be run over by one of the Ibrox cars on the 10th of August, 1882, receiving a comminuted fracture of the right thigh bone, compound dislocation of left knee, with laceration of the skin and flesh of the anterior part of the left thigh.

Dr. Hector C. Cameron, who saw him first with me, thought he could hardly survive the shock. He only saw him once, as he was leaving for his holidays that evening; but Mr. Clark took up the case, and kindly attended with me until the sloughs were nearly removed. In passing, I think it not out of place to mention the great benefit the little patient derived from nepenthe during the three days the shock lasted. He got ten drops every few hours, as the symptoms required. Its soothing effect was shown by the fact that on the third day after the accident, when the first dressings were removed, he was as quiet as if he had been under the influence of chloroform, though that anæsthetic was not used. The dressings at first were the carbolic antiseptic, until the sloughs were removed. After they were removed, nearly the whole anterior and inner aspects of the thigh, down to the knee, were one surface of raw flesh. Sanguine as I was of the *dry dressing*, I had my doubts if I could get such a surface to skin over. If possible I would assist it by grafting—this being a good case for it, so I took a good large graft from the arm of the boy's father and placed it whole about two inches above the lower edge of the sore. It adhered and retained its vitality, and my hopes were raised as I had a good large island of skin to start from. A few days thereafter Mr. Clark called to see the patient, and took a graft from the arm of the nurse and cut it into small seedlets, inserting them into the upper edge of the sore. I repeated grafts from the arm of the father and nurse twice afterwards, inserting them into the outer and inner sides. All the grafts retained their vitality for weeks, but showed no appearance of enlarging or throwing out skin. For about three weeks while these graftings were tried, the dressing consisted of the boracic acid lotion with the muslin, oxide of zinc ointment spread on dry boracic acid lint with other two dry folds of it, the whole being covered over with Mackintosh and bandage, and dressed every alternate day. The sore was healing; the patient bore the removal of the dressings well; had no pain, large as the surface was. Of course great care was taken that the dressings to be removed were well soaked with water. As in the first case mentioned, I laid aside the ointment about the third week, retaining the muslin and three folds of dry boracic acid lint, and allowing each dressing to remain for three days; the skinning went on rapidly and without any intermission. A curious point about the grafts was the fact that they retained their vitality for weeks, but still showed no appearance of enlarging or shooting out skin; they could be seen until the skinning from the edges came up to them.

All know how difficult it is in large ulcers to get the surfaces to skin over with the usual wet method of dressing. Grafting of skin has been resorted to with success in many such cases, but it is rather a troublesome and tedious process, and painful to a generous friend who may be willing to part with some of his skin, or to the patient if there is no substitute. I have no hesitation or doubt in saying that this *dry dressing*, when properly carried out with due care, will do away with the necessity of grafting.

All ulcers, from the healthy to the indolent, are less or more weak. It has been customary in treating ulcers to have the lint cut as near the size of the sore as possible, in wet dressing; the larger the piece of lint used the more apt we are to weaken the part and retard the healing. This made us resort to a stimulating dressing in a variety of ways, the advantage of this *dry dressing* being that it is stimulating from the very outset. There is enough moisture retained in the three or four folds of muslin to protect the raw surface until a sufficiency of pus is thrown out which in turn protects it. The moisture that is derived from the surrounding soft parts embraced within the Mackintosh covering is all that is necessary, more than that would be a source of weakness. The antiseptic action of the boracic acid lint keeps the parts perfectly fresh and sweet for the three days the dressings remain, large as the surface may be, and perhaps longer if the patient be able to take particular care of himself and prevent the dressings becoming loosened.

The oxide of zinc ointment I consider only useful when the raw surface is very large, as in that case the patient bears the removal of the dressings with greater ease and comfort, which is of the greatest importance to a young or irritable patient. The dry boracic acid lint, but for that, can be used at the very beginning.

As to my little patient, both his legs are as straight as legs can be, with no difference in length; the joint of the left knee acts perfectly well, and the anterior surface of the thigh was completely skinned over by the first of this month.

In comparing these two cases—the lady's age being between 60 and 70 and the boy's about 7—the latter had the advantage of youth and a good constitution, the former had not. No improvement took place in her case while I used the wet dressing, but immediately I began the dry, healing took place. In regard to the grafting in the case of the boy, which was not tried in the other patient, no benefit I believe was derived from it.

The strength of the boracic acid lotion used was an ounce and a half to forty of water, first dissolved in several ounces of boiling water and put into a bottle that would take forty fluid ounces, and when required the whole shaken up, and the quantity to be used at dressing time heated, being more than a saturated solution.—*Glasgow Medical Journal, May* 1883, *p.* 377.

AFFECTIONS OF THE EYE.

48.—ON TRANSPLANTATION OF SKIN-FLAPS FROM DISTANT PARTS WITHOUT PEDICLE.

By J. R. Wolfe, M.D., F.R.C.S.E., Senior Surgeon to the Glasgow Ophthalmic Institution, &c.

About eight years ago, I brought before the notice of the profession a new method of transplanting skin-flaps from distant parts without pedicle for the purpose of correcting eversion of the eyelids. (*Retrospect*, vol. 72, p. 246, vol. 83, p. 243.) This operation has since been adopted by ophthalmic surgeons of different countries to a greater extent than I could have expected in so short a period, and has been favourably reported of by them. As the operation has a wider range of applicability, and may be practised for correcting deformities in other parts, I propose to give in this communication a *résumé* of our experience with regard to it.

Cicatrices caused by burns, wounds, and ulcerations have always proved difficult and perplexing to the surgeon who has to deal with them, and when these cicatrices are situated in the neighbourhood of joints or coverings of important organs, their proper treatment becomes of very serious importance.

In skin-grafting, I have, in my opinion, demonstrated that in most cases the pedicle is not essential to the vitality of the flap. M. Reverdin introduced a method of skin-grafting in which little bits of the size of a pin's head are taken and arranged in mosaic fashion upon the ulcer, or upon the site of deficiency of skin. While practising that operation, I was never satisfied with the macadamised appearance of the parts. I also noticed a very important fact in connection with skin-grafting, namely, that the graft which was taken clean adhered satisfactorily, while the bits which had a bleeding under-surface did not adhere to their new site. I thus became convinced that the cause of non-success in transplantation was the areolar tissue underneath, and that, if we could transplant a skin-flap free of that subjacent tissue, we should secure its adhesion and incorporation. To put this to the test, I operated in one case in which the skin required for the eyelid was two inches in length by one inch in breadth. I removed the flap from the forearm in three portions, separating the first from its cellular tissue as closely as compatible with the integrity of the flap, but turning up the other two after removal, and with a knife slicing off the areolar tissue so as to leave a white surface, which I then applied to the eyelid. The difference between these flaps was very remarkable. The two which were previously prepared healed by agglutination, without even desquamation of the cuticle. Twenty-four hours after the operation, the surfaces looked pale, but the next day the temperature was normal, and the appearance healthy. The part which had been applied without previous preparation looked rather livid the first day, improved for the next two days, but on the fourth began slightly to suppurate, and, after a hard struggle for life, only a portion of it remained and the rest shrank. This, however, did not compromise the result of the operation, which was on the whole satisfactory, and I was therefore enabled to formulate the conclusion that, if we wish a skin-flap to adhere to a new surface by first intention or agglutination, we must be sure that it is free of all areolar tissue, and properly fixed in its new place. When thus prepared, we may cut the flap of any shape or size from any other part, or from another person, and transplant it without pedicle.

The shape and size of skin required must be carefully cut out in lint. The piece of lint is then laid on the forearm which is in a state of semi-supination, and the shape traced by the point of a knife, making it larger all round to allow for shrinking. I find that the most satisfactory way of removing the subcutaneous tissue is to snip it off with sharp scissors from the flap spread out on the left fore-finger, then dip the flap in tepid water, and dry it properly.

Dressing and after-treatment.—After the flap has been prepared, it is put on its new site and moulded into position. I prefer not to use sutures for keeping it in place, as the very finest threads sometimes give rise to exudation of pus when the ligature is withdrawn. The best method, if practicable, will after all be that adopted in my first case, namely, to dissect the neighbouring part all round, and push the edges of the flap under it. After the flap has thus been properly moulded into its new site, lint soaked in hot water is held upon it for five or ten minutes, and then a few other pieces of lint wrung out of hot water are laid upon the new flap, and the whole covered and secured by an immovable bandage. The application of carbolic acid, or any other irritant substance, should be avoided as prejudicial, inasmuch as it is apt to remove the cuticle. The head should be kept steady and warm. The patient is kept in bed well covered, and supplied with warm drinks to keep up the temperature of the body. The eye should not be disturbed for the first three days after the operation, after which the dressing should be carefully removed, the last ply of lint being properly soaked with hot water, that it may be removed easily without any dragging or derangement of the flap. It may then be dressed every twenty-four hours thereafter. I have reason to think that some cases did not succeed on account of the *nimium diligentiæ*, and teasing of the part, which requires peace and quietness for its growth. The plan of covering it only with gold-beater's skin is actually exposing it to a chill when moisture and warmth are requisite.

I would recommend also the exercise of patience in the severance of the lids. This should not be attempted for the first six weeks, and even then only done partially at first, as the too early separation of the lids is not advantageous.

The first to adopt this operation was Dr. Wadsworth, of Boston, U.S., who reported a successful case to the Ophthalmological Congress in New York, in September, 1876. Prof. Hirschberg published another successful case of Blepharoplastik. The following year the operation was discussed at the International Congress at Amsterdam, when Dr. Martin, of Cognac, reported a successful case treated by my method. At the same meeting, Prof. Zehender reported three operations for the formation of new eyelids by this method. Although these did not all come up to his expectations, they may still be regarded as on the whole satisfactory.

In America the operation has been taken up and practised by various surgeons. Dr. Aub, of Cincinnati, reported a successful case. Dr. Reeve, of Toronto, presented two cases to the Canada Medical Association—one was a complete and another a partial success. Dr. Noyes of New York, after reporting some successful and unsuccessful cases of his own, and citing others, says:—"A number of cases have proved failures. In some of these instances failure is sufficiently accounted for; at the same time, if out of fifteen cases ten have proved successes, it is something remarkable when compared with those generally obtained by plastic operations." Dr. Eugene Smith, of Detroit, has favoured me with a case which shows complete success in correcting the eversion of the upper lid.

In this country, Dr. Benson, of St. Mark's Hospital, Dublin, has operated in eight cases, in which he performed my operation with Dr. Story. "In five cases some of the transported flap lived, in two of these the greater portion survived, in two a smaller portion than half retained its vitality, whilst in the other one the flap seemed to slough through some of its depth, leaving the portion of it in contact with the new surface alone vital. Three were complete failures, the last being torn off, with the bandage and dressing, by the patient (a child), during the night. Dr. Benson's paper, which he read before the Chirurgical Society, and the interesting discussion which followed, are valuable contributions; and I cannot help expressing my great satisfaction at the thoroughness with which he treated the various points of the question. In the course of his paper he says:—"Of the various plans which have been previously recommended and practised for the cure of ectropion, such as twisting of flaps, transplanting flaps from the face with pedicles, sliding of flaps, &c., all possess the serious disadvantage, from which Wolfe's operation is free, namely, that if union does not take place, and if the flap sloughs, the deformity resulting after the operation is greater than before, and the last state of that man is worse than the first; whilst, in the most successful case, the deformity of the eyelid is diminished at the expense of increased deformity of the face."

Application.—This operation is applicable to cases of deformity or loss of skin of the face, and especially of the eyelid. Its advantage over other methods is tersely put by Dr. Benson, as stated above, but is more particularly noticed in cases in which the neighbouring parts of the face and forehead are also implicated in the burn, and so are unfit for plastic operations. In such cases this operation is the only remedy.

We have lately applied this method to a case of epithelioma involving the inner canthus as well as part of the upper and lower lid. The case was published by Dr. Thomson in Med. Press and Circular, Aug. 2, 1882. The patient, A. M'D., age 65, had, besides the epithelioma, the integument of his forehead and cheek covered with warts and melanotic nodules, and therefore unsuitable for flap-formation. Owing to this touch-me-not of the neighbouring skin, I did not even perform staphylorrhaphia, but, after removing the epithelioma, simply transferred a skin-flap from the fore-arm, and covered the gap. The results were very satisfactory. The case may be considered as a surgical and therapeutic success. — *Practitioner, May* 1883, *p.* 331.

49.—ON THE TREATMENT OF PURULENT OPHTHALMIA.

By Henry Power, M.B.Lond., F.R.C.S.Eng., Senior Ophthalmic Surgeon, St. Bartholomew's Hospital, London.

Recently, Crédé has adopted with signal success a simple plan of treatment—namely, the instillation of a single drop of a 2 per cent. solution of lunar caustic between the slightly separated lids. Of 300 children thus treated, no instance of purulent ophthalmia occurred, even of the mildest type, and no injurious effects followed the instillation of the drop in any case. The mothers were in many instances affected with syphilitic, gonorrhœal, and leucorrhœal disease. He believes that no other of the antiseptic remedies is so safe, so easy, and so innocent as this. It seems to me to be certainly worthy of general trial. Crédé's first suggestion has been adopted in this country by Dr. Grossmann in the Liverpool workhouses, with very satisfactory results; but in a letter which Dr. Grossmann was good enough to write to me, in reply to an inquiry on my part as to whether he had continued the plan since his paper appeared in the Lancet, he says that in one of the workhouses the house-surgeon now always applies iodoform, which he finds answers very well. Grossman dusts the fine powder over the everted lids once in twenty-four hours, but finds that it is more easily applied in solution by the nurses. Dr. Grossmann was kind enough to give me references to two German papers recently published. One is by Dr. Felsenreich of Vienna, in which he gives the experience obtained at the Maternity Charity connected with the University under the charge of Dr. Braun. In this hospital 3,000 children were subjected to Prof. Crédé's last method—namely, the instillation of a 2 per cent. solution of nitrate of silver, with the result that 56 only were affected with conjunctival blennorrhœa, which is equivalent to 1·93 per cent. Königstein of Vienna also bears approving testimony to the method.

In employing antiseptics in the treatment of diseases of the eye it is well to be sure that we do no harm with our remedies, and in this respect the observations of Strassen are deserving of special mention. His experiments were made with rabbits, and he found that very dilute solutions of carbolic, salicylic, and sulphurous acids, permanganate of potash and thymol proved strong irritants. On the other hand, quinine in 1 per cent. solution, chlorine water and pyrogallol in 3 per cent. solution, boric acid in 4 per cent. solution, and benzoate of soda in the proportion of one part to 500, were all comparatively unirritating. In regard to their relative antiseptic power, boric acid and pyrogallol seemed to be the most active.

But in the event of the disease not coming under the cognisance of the surgeon until suppuration is already freely established, what is then to be done? The conditions to be dreaded in these cases are ulceration proceeding to perforation of the cornea followed by prolapse of the iris and sloughing of the cornea. Speaking broadly—though of course there are many exceptions to the statement,—I consider that if the case be brought under the notice of the surgeon who knows what to do, in the course of the first week the disease can generally be cured. If he do not see it till the close of the second week, the cornea is generally involved, and ulceration with prolapse of the iris often occurs; if the third week has elapsed, the eye is often completely lost. If the disease have begun on the second day after delivery, it indicates a severe attack; if not till the fourth or fifth day, it has probably been infected after birth. The progress is in some cases very rapid and alarming, considerable chemosis occurs, an ulcer quickly forms and runs round the margin of the cornea, and the whole cornea assumes the aspect of wash-leather. In other cases again, though tolerably free discharge has taken place, the cornea still looks bright and clear after three weeks, but the rule is as I have stated above.

For many years a very simple apparatus was in use at the Westminster Ophthalmic Hospital which obviates the necessity of using syringes, sponges, cotton-wool, tow, or other means of removing the purulent secretion. It consists of a tin canister holding about half a gallon of pure spring water, which is placed upon a bracket about six feet from the ground; a small tube projects from the lower part, to which a piece of india-rubber tubing is attached; the other end of the tube is connected with a conical piece of brass, guarded by a stopcock. The water may be medicated with one or other of the antiseptic substances. The child should be swathed in a thick towel, so that it may not raise its arms and incommode the operator or get wet, and be held in the arms of the nurse with the head inclined to one side, and a little depending. On turning the stopcock a jet of any required force may be directed against the eye, which may be regulated by raising the canister as well as by the stopcock. The current should be gentle at first, and made to play on the outside of the lids, which, however firmly glued together by the inspissation of the pus, soon open under its influence. The upper lid may then be raised and the stream so directed as to cleanse thoroughly the sinuses of the conjunctiva. A very little instruction is required to teach the nurse how to use the apparatus, and it may be employed two or three times a day. Two cautions require to be given in respect to it—first, that the current should be as gentle as possible until it can be seen whether the cornea is implicated or not. If this is bright and polished, it may be washed with more force; but if it is seen, when the lid is raised, to have lost its epithelium, and still more if there is deep ulceration, the greatest care should be exercised, for the prospects of the child differ immensely according to whether perforation of the cornea takes place or not. If perforation occur, and the aqueous humour escape, adherent leucoma, with displacement of the pupil, and considerable impairment of vision, are the least evils that can befal the patient, whilst too often fistula of the cornea, cataract, and atrophy of the globe are the results. On the other hand, if perforation can be prevented, the eye may escape with only a nebula, or, at most, a leucoma. It is well, in most instances, when the lid is much swollen, to determine the condition of the cornea by the use of the elevator, either with or without chloroform. The second caution is that if the little stopcock be too suddenly opened, and the stream allowed to escape with much force, some of the fluid now charged with pus is apt to rebound, and enter the eye of the nurse, who is then speedily made aware of the poisonous nature of the secretion. The effect of cold water on part of an abundant purulent secretion is to cause its coagulation; and it will often be found after the eye has been to all appearance thoroughly cleansed, and all the pus removed, that if the upper lid be everted a long stringy mass presents itself, which often occupies the conjunctival fold. This may be removed with forceps, or with a piece of clean wet wool, and leaves a clean, not ulcerated or bleeding, surface behind it. This roll often forms the nidus of the virus, and promotes continued suppuration. In washing the eye, and, indeed, at other times as well, it is expedient to protect the other eye, supposing it to be as yet free from disease, with a pad of cotton-wool, or, if this is resented, with a watch-glass, the edges of which may be made to rest on a circular fold of cotton-wool around the eye, and kept in position with a strip or two of diachylon plaster. A plate of mica has been recommended by Dr. Howe with the same object in view. It is not necessary to keep the eye protected in this way for more than a few days; for it seems to be pretty well ascertained that the virulence of the contagium is greatest when the discharge is at its height, and that it is less marked at the commencement and during the decline of the disease. All bandages therefore should be removed when the discharge grows thin.

In some instances the permanent application of cold will be found to be both pleasant and serviceable, and a convenient mode of applying cold is by means of a little irrigator, which is frequently employed at St. Bartholomew's Hospital. It consists of a small bag or sac of caoutchouc, each extremity of which is connected with a long piece of narrow india-rubber tubing. The sac is laid on the patient's eye. One end of the tubing is placed in water, which may be cooled to any desired extent by the addition of ice and what is contained in a vessel placed at a little distance above the head of the patient; the other end is allowed to hang over the bed into a footpan. The tube acts as a syphon, and the rapidity of flow through it can easily be regulated by a pair of bulldog forceps. The only objection to this apparatus is its weight; but if this can be borne, it materially reduces the activity of the pus-forming membrane. If the caoutchouc bag cannot be obtained, it may be replaced by a pig's bladder, to which two pieces of tobacco pipe with some indiarubber tubing are attached.

The employment of caustics differs much in the hands of different surgeons, some strongly recommending, others as strongly condemning, them. Perhaps there is something in the way in which they are applied. De Wecker and Landolt in their authoritative treatise remark that De Gräfe was one of the first to introduce a rational treatment of purulent conjunctivitis by the intelligent and appropriate treatment of caustics, but the right time must be chosen. It is not sufficient to drop in a strong solution for its action, if the secretion is abundant, and there is a risk that the cells of the surface of the cornea may be injured and complications on the side of this membrane favoured. Hence if this membrane be affected at all, cauterisation of every kind should be abstained from. The mode they recommend is to cauterise the palpebral conjunctiva and that of the sinus alone. They employ by preference the solid mitigated nitrate, consisting of one-third of nitrate of silver fused with two-thirds of potash nitrate, though lately they have thought that corneal troubles were sometimes referable to this method, however cautiously performed, and have resorted to the use of a 2 per cent. solution of the silver nitrate. If the solid mitigated nitrate be used, a brush dipped in a solution of common salt should be at hand and applied to the lid, with the view of neutralising any excess of the nitrate, and the lids should then be freely washed with pure cold or cool water. In ten or fifteen minutes the eschar begins to separate, and becomes quite detached in the course of an hour. The lid in the meanwhile becomes hot and painful, and there is much lacrymation. A period of remission follows, succeeded by one of recrudescence, when the cauterisation may be repeated.

Various other remedies have been recommended of late years to arrest the discharge. Thus M. Planchet has recommended the employment of ergotine as a topical remedy. He employs it in the proportion of one part of ergotine to twenty parts of glycerine or of rosewater, and instils one drop every two hours, whilst a compress wetted with the fluid is applied externally. The action of ergot as a stimulant of the vasomotor system of nerves, and of the unstriated muscular tissue, is well known, and its action may here be prompt and effective on account of the superficial position of the vessels. Haltenhoff and De Wecker, again, have drawn attention to the value of eserine sulphate as an antipyogenic remedy, which might be expected to act in the same manner as ergotine. Haab recommends solutions of resorcin, which he applies directly to the conjunctiva with a brush, in a two, three, five, or even ten per cent. solution. He at the same time endeavours to reduce the inflammation by the steady and persevering use of ice. Tannic acid and glycerine have also been suggested.

The plan of snipping the chemosed conjunctiva for the purpose of allowing the escape of the serum effused into the connective tissue is sometimes practised, but I cannot say that it has, in my experience, proved very useful, and I think it has the disadvantage of complicating an already sufficiently serious disease. There can be no serious pressure on the vessels on account of the great extensibility of the conjunctiva, and a wound of the surface may permit the entrance into the lymphatics and vessels of poisonous materials that might otherwise remain on the outside of the body. Still, if the cornea be deeply buried, and the chemosed conjunctiva protruded far between the lids, and threatened to become dry and scabby, I should not object to incise it; but care should be taken in all instances not to excise any of the membrane. An analogous proceeding, having the same object in view, the relief of the chemosed conjunctiva and engorged vessels of the eye, has been recommended by several authors—viz., to make a deep incision from the external canthus towards the external ear.

I must not omit, in conclusion, to refer to the plan recently suggested and warmly recommended by Mr. Bader which consists in injecting beneath the eyelids with a specially constructed syringe about two drachms of an ointment composed of one ounce of vaseline with one grain of atropine sulphate and one grain of red or binoxide of mercury. Mr. Bader claims that this reduces the amount of discharge, and acts very favourably even in cases where the cornea is implicated. Some further evidence of its utility is required, though the cases he has recorded responded well to its action and it gives no pain. It does not appear to be very easy to apply except by skilled hands.—*Lancet*, *June* 2, 1883, *p.* 939.

50.—ON THE TREATMENT OF ULCERS ON THE CORNEA.

By Henry Power, M.B.Lond., F.R.C.S., Senior Ophthalmic Surgeon and Lecturer on Ophthalmic Surgery, St. Bartholomew's Hospital.

Of the diseases of the cornea, ulceration is by far the most common; and there are several forms, the appropriate treatment of which is far more dependent upon a just conception of the general condition, diet, and hygienic surroundings of the patient than upon any specific or local measures.

Amongst the various forms of ulcer of the cornea, one of the simplest, most common, and at the same time inadequately attended to and treated, is the *phlyctenular ulcer*. The position of the ulcer varies; it is sometimes situated on the cornea, sometimes on the conjunctiva, sometimes just at the junction of the two. It is sometimes single, sometimes multiple and arranged in a bead-like fashion round the corneal margin, sometimes small, and sometimes forms a rather formidable sore. Both eyes may be affected simultaneously, or there may be a succession of crops. It is most common in childhood, but may occur in adult life, or even in advanced age. The appearance of the ulcer is usually preceded by some redness and irritation of the conjunctiva, which last for some days. A small vesicle then appears, and after remaining a few days bursts, and presents an ulcer with a raised yellowish surface surrounded by a vascular zone. When seated on the cornea, in which case there is rarely more than one, there is often a leash of vessels running up to the ulcer, giving the eye an angry and inflamed aspect. The degree of intolerance of light varies remarkably in different instances. One child will have several ulcers, and will open the eye with the greatest freedom; another will hold a handkerchief to the eye throughout the day; whilst a third will sit for hours in a dark corner, with the head buried in the hands, the eyelids closed, and the head turned away from the light, resisting with all its might and with loud cries any attempt on the part of the surgeon to examine the cornea. In such cases the child often becomes more lively in the evening as the light grows dim; it will then play about and be apparently unconscious of any trouble in the eye, and it may then be seen that the degree of conjunctivitis is slight and out of all proportion to the intensity of the symptoms. The terminations of the disease are various: the ulcer, if left alone, sometimes heals up, leaving only a slight nebula; whilst in other instances its duration is very protracted, and it exhibits a tendency to perforate. The pathology of the disease was well made out by Iwanoff, and, though familiar to ophthalmic surgeons, is not generally known. It is essentially a neurosis. The little elevation or vesicle is in the first instance composed of a number of small cells or leucocytes, which are situated beneath the epithelium of the cornea, and extend for some distance along the sheath of the corneal nerves. The epithelium falls off, leaving a raised ulcer with yellowish base.

The medical treatment should consist in the administration of a good purge composed of jalap or scammony and calomel, the use of which is often shown by the expulsion of one or two round or a mass of thread worms. The frequency with which this affection is associated with the presence of worms is an additional evidence to the view I take that the cause of the disease is disturbance of the functions of the intestinal canal. As soon as the purge has acted, the administration of quinine may be commenced either pure or in the form of the ferro-citrate. When the intolerance of light is considerable, a drop of a two-grain solution of atropine may be instilled every or every other morning; but by far the most effective local remedial means is found in what is commonly called Pagenstecher's ointment, which is a combination of vaseline with binoxide of mercury in proportions varying from one to ten or even fifteen grains to the ounce. This forms a yellow ointment, which in the milder forms gives scarcely any pain, but in the stronger proves sharply irritating to the eye, inducing free lacrymation, considerable congestion of the conjunctiva and pain lasting some minutes. It is, moreover, exceedingly effective, and may almost be regarded as a specific for phlyctenular ophthalmia.

A second form is one that used to be called *rheumatic ulcer* by Mr. Guthrie, and the term seems to me to be very appropriate, for it is particularly liable to occur in those who are otherwise disposed to rheumatism, and it is an inflammatory affection of a fibrous tissue presenting many of the characters of rheumatic disease in other parts of the body. And just as ordinary rheumatism may attack a particular joint or the tendons of one or two muscles, so one or both corneæ may be affected, whilst other parts remain free. It is not of common occurrence in those who are under twenty years of age. The attack can often be traced to a chill produced by some casual exposure to cold, such as travelling in damp clothes, getting wet feet, or check to perspiration from sitting still in a draught after being much heated with exercise. It is especially likely to occur under circumstances of exposure to cold, if no food have been taken for some hours, or if the patient have been fatigued or exhausted with night watching, mental anxiety, or if the general health be disturbed with confined bowels. Men are more frequently attacked than women. The usual course of the disease is that there is some feeling of aching tension and discomfort about the eye; a slight vesicle forms, which soon bursts, and the epithelium, separating from a small area of the cornea, leaves an ulcer which presents some characteristic features. When first seen it is usually shallow and situated near the margin of the cornea. The edges soon become jagged and irregular, and rather steep. The form of the ulcer is elongated, the base may be clear or yellowish, and the adjoining region of the cornea is often clear or but slightly infiltrated or charged with leucocytes. With moderate care it may heal up in this condition, but if neglected the depth increases, the margins of the ulcer become swollen and cloudy, and the sclerotic generally, as well as the conjunctiva, participate in the inflammatory congestion of the parts. There is, however, little or no secretion of pus, which distinguishes the affection very sharply from catarrhal ophthalmia and other diseases of the conjunctiva. The degree of lacrymation and of intolerance of light varies considerably, but both symptoms are usually well marked. The media, if the patient will allow an ophthalmoscopic examination to be made, are clear and transparent and the fundus is healthy; and this is in accordance with the fact that vision is fairly well preserved, or at least is not more impaired than might be expected to result from the presence of tears and the consequent unequal refraction of light which attends any effort to use the eyes. One of the most characteristic features of the affection is the pain, which is of a distinctly rheumatic character, resembling the rheumatic pains of joints in being of a dull aching tensive nature, presenting remissions and exacerbations, and particularly liable to attack the patient on lying down to rest and getting warm in bed, or awakening him in the early morning at a fixed hour. The bowels are often confined, the tongue white, and the urine high-coloured with deposits of lithates or of uric acid itself. The patient complains of weariness and of aching pains or neuralgia in other parts of the body. The disease is common in those parts of the country which are low and marshy; and in the out-patients I see at Chatham, which lies low, and which is surrounded by extensive marshes on the north and north-east, and has the valley of the Medway to the south, I meet with an unusually large number of cases in which the sclerotic and cornea, the fibrous tissues of the eye, are affected. The ulcer, though lasting for a long time, and slow to heal, does not often proceed to perforation, although this sometimes occurs; the aqueous then escapes, the iris protrudes, forming a small black elevation, and either a fistula forms, or after some weeks the severity of the inflammation begins to decline, especially if appropriate treatment have been adopted; healing then takes place, the ulcer fills up, and a white scar on the cornea, and an adhesion of the iris to the ulcer, causing some displacement of the pupil, are all that remain. In many instances, even when the ulcer has been deep, provided it has not perforated, complete recovery takes place, the cornea preserving its transparency, and vision being untroubled.

The treatment of these cases requires that the general principles applicable to the cure of rheumatism be put in force. Everyone knows how resistant rheumatic affections are, because the local disease is only a manifestation of constitutional disturbance, an evidence of profound changes in the composition of the blood, which, being dependent on the mode of life and general surroundings of the patient, are not easily modified or removed. An intelligent surgeon therefore endeavours to effect an improvement in the general health of his patient, satisfied that if the digestion, which is often at fault, can be made more perfect, the circulation and respiration more active by vigorous exercise, and the secretions more free, the local disease may safely be left to itself and the reparative powers of the system, care only being taken to reduce inflammatory symptoms to moderate limits, and to avoid the occurrence of the special complications to which the eye, as compared with any other structure of the body, is liable. With these objects in view the patient should be directed to avoid exposure to cold, and to remain indoors. In the case of the poor, the admission to a hospital where they are at once placed under favourable conditions as regards temperature and freedom from draughts, to which they are so liable in their own dwellings, quickly effects a change for the better. In the better classes the room should not only be warm but well ventilated, and it is not expedient to keep the patient in the same room throughout the day and night; on the contrary, he should be made to rise and spend the day in another but still well-warmed room. A good average temperature is 68° F.

Many rheumatic patients suffer from constipation, and Abernethy's practice of a blue pill and black draught is by no means a bad introduction to other treatment. It clears the bowels, unloads the liver, and places the patient under favourable conditions for the employment of alteratives. It is really astonishing in such cases what a quantity of offensive material is shown to have accumulated and is dislodged, especially in those whose habits are sedentary and very regular, even though, as we are assured, the bowels are open every day. Having cleared the alimentary canal, we may then adopt one of several plans. I have tried them all repeatedly with varying results, but upon the whole, as a matter of routine treatment, I almost invariably commence with a combination of aconite, colchicum, and quinine, which in a large number of cases proves extremely serviceable, relieving the pain, procuring sleep, and tranquillising as well as strengthening the patient. If this, in addition to the local measures which I will presently mention, does not procure relief in the course of three or four days, I exchange it for potassium iodide and the decoction of cinchona, which acts well when there is any suspicion of a specific taint. I have found from five to ten grains sufficient when given two or three times a day, and have never ventured on the heroic doses now sometimes ordered, though it is quite possible they might succeed where smaller doses fail. Where both of these methods fail and the case lingers on, the compound guaiacum mixture of the

Pharmacopœia is occasionally very useful, and I can recall several instances where it has apparently effected a rapid cure. A disagreeable but powerful agent in rheumatic affections of the eye is to be found in turpentine. The great objections to it are its flavour and the eructations to which it gives rise, as well as in rare instances the urinary troubles; but the first objection may be met by giving it in capsules, and the latter by combining with it a little peppermint-water and tincture of opium; in twenty-five minim doses it has been in my hands very serviceable. Advantage again will be obtained in some cases from the alkaline treatment originally suggested or strongly recommended by Dr. Fuller, in which the bicarbonate of soda and nitrate of potash are administered in some light vegetable tonic, such as calumba or gentian. Lastly, the salicylate of soda has been of great service at St. Bartholomew's Hospital.—*Lancet, June* 23, 1883, *p.* 1079.

51.—ACTION OF VERY DILUTE SOLUTIONS OF ESERINE, AND THEIR USE IN THE TREATMENT OF WEAKNESS OF THE CILIARY MUSCLE.

By John C. Uhthoff, M.D.Lond., F.R.C.S., Surgeon to the Sussex Eye Hospital.

Solutions of the extract of Calabar bean, or of its active principle eserine, have for some years been used for the purpose of contracting the pupil or stimulating the ciliary muscle; but, as far as I can ascertain, these solutions have always been of a strength far greater than that of those, the use of which it is the object of this paper to advocate. Apparently, also, they have been recommended only in cases of decided paralysis of the pupil or the accommodation. Two important papers on the subject have been published. The first was read by Dr. Argyll Robertson before the Edinburgh Medico-Chirurgical Society in February 1863, when the use of solutions of the extract of Calabar bean was first recommended for cases of weakness or paralysis of the ciliary muscle. The second was by the late Mr. Soelberg Wells, in the Medical Times and Gazette for May 16th, 1863, recounting the effect on the pupil and accommodation of a strong solution of the extract (one minim corresponding to four grains of the bean; I may here mention that the yield of eserine is uncertain, so that the relative strength of it and the extract of the bean must be reckoned by the results of their application). Experiments were made upon Mr. Bowman, who graphically relates his own experience, and upon a patient with paralysis of the ciliary muscle and iris. Irregular and somewhat painful spasms of the muscle commenced after ten minutes, and continued for some hours, causing the nearer approach of both far and near points of vision. In Mr. Bowman's case, the pupil remained fully contracted for eighteen hours, and did not return to its normal size for three days. Attempts to use the eye while the drug was in full action caused much distress and pain in the eyeball. Mr. Wells ends his paper with the following remarks: "My next experiment will be to test the curative influence of the Calabar bean upon paralysis of the pupil and accommodation; and to ascertain whether we cannot succeed, by periodic applications of a very weak solution of the bean, in exciting the sphincter pupillæ and ciliary muscle to gentle contraction, without fatiguing and weakening them by over-stimulation." Accordingly, on reference to the last edition of his work on *Diseases of the Eye* (1873), I find that he relates his experience of the drug applied in cases of ciliary paralysis. But he seems to have used comparatively strong solutions, for he says that the drug should be applied of "a strength sufficient to cause considerable contraction of the pupil, and should be used at intervals of several days." Mr. Nettleship, in the appendix to his work on *Diseases of the Eye*, lately published, mentions solutions of eserine of two strengths (one grain and four grains to the ounce), and remarks: "A very weak solution acts only on the pupil, not on the accommodation," a statement which, I think, my further remarks will show to be generally incorrect. Cases of restored power after paralysis of the ciliary muscle, by the use of fairly strong solutions of eserine, are recorded by Mr. Hutchinson (Medical Times and Gazette, Sept., 1864), Mr. Wharton Jones (Practitioner, Sept., 1869), and Professor Gübler (Medical Times and Gazette, 1874).

I have made experiments on myself and others with solutions of eserine, of strengths varying from gr. $\frac{1}{80}$ to gr. 1 to the oz. (gr. $\frac{1}{80}$, gr. $\frac{1}{40}$, gr. $\frac{1}{24}$, gr. $\frac{1}{20}$; gr. $\frac{1}{12}$, gr. $\frac{1}{4}$. and gr. 1), most of the trials being on my own eyes, which are, I believe, nearly normal in every respect.

I will now give the general results of a number of experiments carefully recorded at the time of observation. First, as to the effect on the ciliary muscle. It is a somewhat difficult matter to separate the result of increased power of accommodation from that produced by contraction of the pupil, for either will cause a greater acuity of near vision. The following effect was interpreted to mean increased action of the ciliary muscle, independent of any contraction of the pupil. A varying time after applying the solution to one eye, which, for distinction, we may call the affected eye, small type viewed with both eyes became indistinct, this being evidently due to dimness of the affected eye. When the latter was closed, the print was clearly seen by the normal eye; when, on the other hand, this was closed, sight with the affected eye was at first dim, but on relaxing the accommodation, or bringing the type closer, vision again became clear. With the weaker solutions (gr. $\frac{1}{12}$ to gr. $\frac{1}{80}$) this dimness was only noticed during near vision, letters at twenty feet being perfectly distinct; thus, I think, indicating that the action of these weak solutions is to cause increased irritability, rather than a state of spasm of the ciliary muscle, so that the same effort of accommodation causes a stronger contraction in the affected eye than in the other; hence, while the normal eye is naturally accommodated correctly, the other is sighted for too near a point, and the type is therefore indistinct. From this mode of action arises their great value; they do not cause an artificial state of myopia, such as is produced by a four- or even a one-grain solution, but only a more ready reaction of the ciliary muscle to nerve-stimulus, the very improvement that we desire when that muscle is deficient in tone. Now, in my own eyes, this peculiar action on accommodation was distinctly, though but slightly, evident after the use of the $\frac{1}{80}$ gr. solution, as also was the case in two other persons experimented upon; while, in a third, neither this nor the $\frac{1}{40}$ gr. solution had any effect. The accommodation commenced to be influenced from five minutes (gr. 1) to twenty minutes (gr. $\frac{1}{80}$) after instillation, and the effect lasted to a noticeable extent from two hours (gr. $\frac{1}{80}$) to four hours (gr. 1). The full action of the one-grain solution was accompanied by the well known pain of an over-worked hypermetropic eye, but the use of the weaker solutions caused no pain or distress of any sort, another recommendation for their use in preference to those of greater strength. The pupil was in each case contracted to a degree corresponding to the effect on the accommodation. The contraction always commenced very shortly after that of the ciliary muscle, but lasted for a much longer period, even for two or three days after the use of the stronger solutions. In the case of the $\frac{1}{80}$ gr. solution, the effect on the accommodation was noticeable for at least five minutes before the pupil could be seen to be contracted, and ceased long before the latter returned to its natural size, clearly proving that the increased power of near vision was not alone due to the smaller size of the pupil.

All the solutions caused twitching of the palpebral portion of the orbicularis—very slight with the weakest, considerable with the strongest. This commenced in from five to fifteen minutes after instillation, and continued for from fifteen to forty minutes. The twitching was increased by straining the accommodation to near vision. Thus, when testing the 1 gr. solution, I found that reading caused the twitching to recommence, though it had completely ceased when the eyes were at rest;

just as clinically we constantly meet with blinking in hypermetropic children who have strained their accommodation. Therefore, this drug acts peculiarly on two muscles supplied by the third nerve, and also on a third supplied by the facial; and the action of the latter is increased by a nerve-stimulus (effort to accommodate) passing to one of the former. Again, the stimulus of increased light caused not only more contraction of the pupil, but also increased twitching of the eyelids of the affected eye, and I need hardly call attention to the irresistible contraction of these inner fibres of the orbicularis under a strong light. The associated action well-known to exist between the palpebral portion of the orbicularis and the ciliary muscle and pupil is thus forcibly illustrated by the action of the eserine. The twitching of the eyelids always commenced a few minutes before the pupil or the accommodation were influenced; a fact which may be accounted for by a more rapid absorption of the eserine through the conjunctiva than through the coats of the eyeball; that is supposing the drug to act directly on the muscular fibres, or on the nerve end-organs.

The therapeutic use of weak solutions of eserine was first pointed out to me by Mr. Bader, about a year ago; and since then I have made trial of them in a large number of cases of failure of accommodation, and with very considerable success. I generally order a $\frac{1}{40}$ grain solution to be used three times a day, and I warn the patient that he may experience some unpleasant twitching of the eyelids, and possibly a little dimness of sight, for a short time after applying the drops. In some cases benefit has accrued at once, has continued so long as the drops have been used, and has lasted for a varying period after their discontinuance. In some, the improvement has passed off, and I have been obliged to increase the strength of the solution in order to continue the effect. In other cases, and they have been few, no benefit whatever has resulted.

I have found these solutions more especially beneficial in two classes of patients. The first and chief class consists of cases of slight hypermetropia in young adults, where the error of refraction has caused no defect of vision until—through some failure of general health, or perhaps from overtaxing the eyes by an excess of near work—the power of accommodation has failed, and then there has arisen an array of troubles sufficiently well known; headache after near work, and inability to continue at it for any length of time, especially if by artificial light, being chief among the number. In such patients the treatment is particularly valuable, and may keep the power of near vision at its normal standard, until, with rest and an improvement of the general health, the muscle recovers its normal power. As an example of this class I would mention the case of a young lady, who was sent to me suffering from all the troubles incident to the presence of an accommodating power insufficient to compensate for the slight amount of hypermetropia (1 D) which existed. Her sight had been good until a few months before coming to me, when she thought she strained her eyes by doing an unusual amount of near work by artificial light. Her far vision was good, and she could read D 0.5 Snellen for a short time with ease. The use of $\frac{1}{40}$ grain solution of eserine three times a day caused immediate improvement, and at the end of a fortnight she wrote to me saying that she was able to paint and read steadily and with comfort for a much longer period than she had been able to for six months before. Secondly, patients with high myopia, even when fitted with suitable glasses, are sometimes unable to use them with any comfort for near vision, this being often in great part due to the feeble accommodating power such myopic eyes possess. These persons will speak gratefully of the benefit they derive from the use of weak solutions of eserine.

Considering how large a proportion of all the patients seen by ophthalmic surgeons are suffering from some error of refraction or accommodation, I feel that I need no apology for bringing before the profession this simple method of treatment.—*British Medical Journal, July* 7, 1883, *p.* 5.

MIDWIFERY,

AND THE DISEASES OF WOMEN AND CHILDREN.

52.—ON AXIS-TRACTION FORCEPS.

By ALEX. RUSSELL SIMPSON, M.D., F.R.S.E., Professor of Midwifery in the University of Edinburgh.

[Professor Simpson read a paper on Axis-traction Forceps before the Edinburgh Obstetrical Society two and a half years ago. He applied this designation to the forceps invented by M. Tarnier, or such modifications of them as he then recommended to the use of the profession. In a further communication printed in the Edinburgh Medical Journal for October (illustrated by many beautiful woodcuts) he observes :]

Their essential feature consists in their having traction-rods joined to the proximal end of the blades, and curving backwards towards a transverse bar which serves as the traction-handle of the instrument. The attachment of rods to the blades allows of direct traction on the head in their embrace. The backward compensation curve (perineal curve, it is sometimes called) of the rods allows of the traction by a curved instrument through a curved canal without loss of power, and without misdirection of force. The jointing of the rods allows the advancing head to move the application handles in the constantly-changing direction along which it is travelling ; and the direction of the application handles thus furnishes the operator with an unerring index to the proper line of traction.

Since these Tarnier forceps were discussed among us they have been discussed in many associations, and by many writers, and the voices are still so discordant that it seems as if a final judgment as to their value were still far off. I am anxious to bring them up again in the Society, that we may have an opportunity of considering some of the objections that have been advanced to their use, and some of the suggestions that have been made for their improvement.

In taking up the adverse criticisms that have been made to Tarnier's forceps, I notice that they have already earned for themselves the sure note of a permanently valuable invention, that it is said of them, They are not new. Dr. Albert Smith, *e.g.*, in the able and lively paper in which he introduced the discussion in the American Gynecological Society, alleges that the Tarnier instrument is only a resuscitation of the disused apparatus of Hermann of Berne. Hermann saw as clearly as any of us do, and indicated very forcibly, the difficulty of extracting the head with a curved instrument through a curved canal. He felt the necessity of correcting the loss and misdirection of the power that results from traction through the handles, by making pressure in the neighbourhood of the lock from the front (above, if the woman be on her back), or by dragging on the lock from behind (below, if the woman be in the dorsal decubitus). To correct this loss and misdirection of power, one practitioner would rest the end of the long handles of the forceps on his shoulder while making traction with both hands clasped round the lock. Another would drag on the handles, and press with his knee upon the lock. I have seen an obstetrician who had committed the traction to two assistants pulling by the hooks at the handle-ends, himself with his hands clasped round the lock close to the vulva, pulling in a backward direction. I remember assisting Dr. Kirk in my native town, nearly thirty years ago, in a difficult case, where two of us made traction on the handles and on a towel tied round them, while he manipulated the lock and shanks so as to press back the head into the hollow of the sacrum. Now Hermann's contrivance simply consisted in applying an instrument like a two-pronged fork, with a transverse bar for a handle, into two depressions close to the forceps' lock. The fork is so contrived that it may be applied either from the anterior (upper or pubic) aspect, so as to make backward pressure while traction is made through the handles, or from the posterior aspect closer to the blades, so as to make backward traction to correct the loss and misdirection of force applied to the handles. But this ingenious attempt of Hermann to render more precise the point at which the corrective pressure is applied, has nothing in common—and I wish broadly and again to emphasize my allegation—with the Tarnier traction-rods, which make traction, I repeat, directly on the head-embracing blades; which have a compensation curve allowing of direct traction in the axis through which, at any given moment, the centre of the head should move; and which are guided in the course of their action by the constant change in the direction of the application-handles—change permitted and produced by the loose jointing of the traction-rods to the heels of their respective blades. Dr. Smith seems to think that Hermann's contrivance was lost sight of, only because he had not the opportunity of proclaiming its value from a professorial chair. He seems not to know that not only was Hermann Professor of Midwifery in the University of Berne—he enjoyed also the Persian blessing of being succeeded in his office by his son. No; his suggestion fell dead, because, as Dr. Smith's paper shows, its object can be effected just about as well or as ill with the unarmed hands. From Dr. Smith's own drawings we can see him attempting to avoid loss of power and misdirection of it by clasping his hand over the neighbourhood of the lock, and making backward pressure with the ulnar edge, while the thumb pushes the extremities of the handles upward and forward; and Hermann made the same attempt, by pulling with one hand on the handles, and pressing with the other, by means of his fork, on the lock.

There is more force in the allegation that Tarnier's forceps is the same in its principle of action as the forceps with recurved handles of Hubert or Aveling. Hubert and Aveling have both, and I believe independently, demonstrated the impossibility of making correct traction with forceps having curved blades and straight handles. They have both, accordingly, advocated the use of instruments made with a compensation or perineal curve on the handles. In this the Tarnier forceps precisely corresponds with such S-shaped forceps. The compensation curve on the traction-rods, where they approach the traction handle, has precisely the same effect as the curve in the handles of the scientifically constructed forceps of Hubert and Aveling,—the effect, namely, of allowing direct traction in the axis of the pelvis without loss or misdirection of effort. But while the Tarnier forceps has the correct axis-traction curves in common with both these forceps, it has, in addition, the distinctive feature of having the traction-rods (as I have already said more than once) so jointed to the blades that the movements impressed on the application handles gave a constant guide to the operator as to the direction in which we ought to pull. Now this double property of the Tarnier forceps—of, *first*, giving power of correct traction, and, *second*, giving a guide to the proper direction—puts the obstetrician who uses it at a great advantage over the operator who has only an ordinarily curved instrument in his hand. It is vain to tell us who have employed such axis-traction forceps that you can do so and so with the older instrument. We fancy we know precisely what we can do with that. We have used it in all imaginable cases, and have had recourse to the various manipulations recommended with the view of obviating the loss and misdirection of power that their construction involves. In the simple cases—and these, to be sure, constitute the majority of forceps cases—we have accomplished the delivery of the child to our perfect satisfaction, and without the expenditure of much strength or skill. But cases have sometimes met us that tried all our strength and taxed all our skill, that sometimes baffled us completely, or were terminated by the extraction of a damaged child from a damaged mother. And now we find that the axis-traction forceps enables us to effect delivery in such cases with less expenditure of energy and with more precise direction of power; hence, not only with more ease and comfort to ourselves, but with more safety to the woman and the child. Let who will continue to use ordinary curved forceps, an obstetrician who has used the Tarnier forceps in a few test cases will no more think of reverting to the other than a man who can afford to keep a carriage will continue to practise as a peripatetic. He may use the defective instrument occasionally to keep muscle and mind in exercise, or because the case is so easy that it can be finished with anything, as he may walk to some patient's house for the sake of his own health, or because she lives in the same street; but in the general run of his work, and in all his difficult cases, the axis-traction forceps becomes for him a valued necessity.

Objections have been offered to the Tarnier forceps in regard to its construction. It is a misfortune that in his earliest models Tarnier had the compensation curve not only on the traction-rods, but on the application handles. This curve in the handles was to my own mind one of its drawbacks. When we have become familiarized with the introduction of curved blades with straight handles, we feel as if we had to learn all our lesson over again when we begin to use an instrument with recurved handles, even of the simplest form, such as Hubert's or Aveling's. In his more recent models Tarnier has quite done away with the curve in the shank and handles, retaining only the curve of the traction-rods.

Objection continues to be made to the use of the fixation screw, which is supposed likely to cause and keep up too forcible compression of the head of the child, as if it could impart to the forceps something of the character of the cephalotribe. But it is important to remember that whatever the kind of forceps employed, the head is inevitably compressed. In the testing cases the operator who pulls on the head by grasping the ordinary handles, compresses the head with a force which he loses all power of estimating, and which perhaps he only realizes when he sees it imprinted, as it has been times without number, on the scalp or even skull of the infant. The use of a fixation screw enables the operator to compress the head to a degree which his unstrained muscular sense enables him to appreciate with great precision. He has only to fix the screw at the point where he feels that he has obtained a grasp of the head that is sufficient to hold it fast and that is safe in its amount of compression. It thus, as Professor Howard of Baltimore has clearly recognised and fittingly stated, comes to be a "regulation screw," preventing the justly-dreaded danger of over-compression of the head.

To my own axis-traction forceps the objection has been offered by Dr. Barnes that the instrument is too small. I have never yet met with a case where the model I exhibited to the Society did not suffice to reach the head and extract it even when the head lay above the brim. But I know no reason why the forceps should not be made as long as those of Dr. Barnes, at least as regards the blades and shanks. The forceps I have recently used accordingly measures 9 inches from the lock to the tips of the blades.

Besides thus increasing the length of the forceps, I have, at the suggestion of Dr. Hart, made a slight change in the flattened extremities of the rods to which the knobs are attached. It was found that the head of one of those knobs or buttons was liable to break, because the rods met the locking-plate at an angle. But by making the flattened ends of the rods pass at an angle from the stem and lie parallel to the locking-plate, all risk of such an accident is obviated.

Dr. Lyon objected that the traction-rods were not of sufficient strength. This difficulty also it would be easy to overcome. But I have tested the rods that I have had in use, and find that a weight of 200 lbs. does not strain them; and I do not suppose that in my most difficult case I have found it necessary to apply nearly half that force.

Every effort to improve the axis-traction forceps is a witness to the value of the principle on which they are constructed, and M. Tarnier, who has repeatedly modified the form of his own forceps, has shown no jealousy of the proposed modifications. Doubtless, changes will yet be suggested which will be found to render the instrument more manageable without compromising its utility. I can easily believe that in the process of evolution the application-handles will become lighter and less, and the locking plate more simple and at the same time more secure. But whatever changes may be effected in the construction of the forceps, it seems to me that the perfect instrument must, *first*, have its traction-rods permanently attached each to its own blade. It is no advantage, but a drawback, to have the traction-rods so contrived that they may be used in one case and not in another. No operator who has the option of making axis-traction should ever expose himself to the temptation of pulling by the application-handles. I began myself with the error of fitting removable traction-rods to our British forceps, but quickly learned that the rods were a necessity for every case, and must be permanently attached to their respective blades. I think, even, that there will be no loose or separable part of the instrument, as in Tarnier's and Lusk's models, when the instrument is perfected.

This leads me to remark, *second*, that the traction-rods must be so contrived as to be capable of being easily locked and unlocked. Perhaps, for example, instead of having them to meet in a locking-plate, as in my model, the traction-handle might be attached to the left rod by a ring, into which the right rod could be hooked. Then, *thirdly*, the fixation screw must be applied close to the lock, and be capable of easy manipulation, because, after each tractile effort it is well to relax it, and it must again be fixed before renewing the effort.

And now, before closing, I will try to show you that the introduction and adaptation of forceps furnished with permanently attached traction-rods, offer no greater difficulty than in the use of our ordinary forceps.

The left half of the instrument is, as usual, to be first introduced. This has the traction-bar or handle attached to its traction-rod; and if the rod be pushed in front of the shank it offers no difficulty to the manipulator. The handle should be held in the left hand, and guided into the canal with the fingers of the right. The blade having been passed according to the usual rules, and adapted to the head, the traction-rod is pushed back to its ordinary position. The traction-bar is loosely-jointed and swings freely about without at any time interfering with the passage of the second blade. When the patient is placed, as she commonly is with us, on her left side, it is not even necessary to take the precaution of pushing the left traction-rod in front of the shank. But in introducing the right half of the instrument, it is in every case necessary to push forward the traction-rod. If it be left swinging backwards it is apt to get entangled in the left half of the lock. This blade (held as usual by the right hand, and guided with the left) and having been passed first backwards towards the hollow of the sacrum, and then round so as to be applied to the side of the child's head, the operator pushes back the traction-rod, and proceeds to lock the instrument in the usual way.

I was at one time afraid that in cutting off the German traction-hooks or shoulders we should be deprived of the power of easily adjusting and locking the blades, which we obtained by placing the thumbs on these lateral projections in our old familiar forceps. But I find that the projections of the fixation screw on the anterior surface afford the same facility. If, therefore, after the traction-rods are in their proper place, we grasp each handle with its own hand, and place the thumbs on the two parts respectively of the fixation-screw, we obtain a purchase for moving the blade in any direction so as to secure their proper adaptation and their easy locking.

So far the application of axis-traction forceps corresponds to the application of the ordinary instrument, but for the necessity of shifting the position of one or both of the traction-rods.

But now, further, we proceed to lock the loose right traction-rod by passing its knob or button into the slot in the locking-plates. This manœuvre is not difficult, and is done in a second or two after we have practised it for a few times either on the phantom or when simply holding the forceps in the two hands. The locking is effected by laying hold of the application-handles with the right hand and the traction-handle with the left. The thumb of the right hand lays hold of the free extremity of the right traction-rod, the fore-finger of the left hand brings the locking-plate into relation with it, and so the locking is effected.

When an obstetrician has taken the trouble to apply to the head of the child a pair of axis-traction forceps, he finds himself more than compensated by the additional power he finds himself able to employ in the difficult cases, the delicacy of touch with which he feels that he can manage these cases, and the certainty with which he can pull in the pelvic axis in every case. Before applying traction, however, he grasps the application-handles until he feels that he has got a hold of the head so firm that the blades will not slip, yet not so forcible as to produce injurious pressure. At this point he secures the fixation screw. He then proceeds to make traction with one or both hands, grasping the transverse bar or traction handle. In the great majority of cases the traction is made with the right hand alone, the left being free to watch the progress of the head and guard the perineum. Traction is made as usual during the pains, and when no pains are present, at intervals. After each tractile effort the fixation screw may be slackened, to be fixed again before the next pull. The most important rule to be observed in using axis-traction forceps is, *to keep the traction-rods parallel with the shanks.* When the rods are parallel with the shanks, the cord of the pelvic curve of the blades run in a straight line to the centre of the traction-bar, and hence traction on the bar carries the head along the axis of the pelvic plane occupied at the given moment by the fœtal head. As the head descends the application-handles must never be touched, and they can be seen to move more and more forwards until at last, as the head emerges from the outlet, they lie nearly parallel with the abdominal wall.

I have already said that the use of properly curved traction forceps is necessary in every part of the parturient canal. And now, with regard to the perineal part of the canal, I wish to remark especially that axis-traction forceps with jointed rods enables us to guide the head more accurately along it. We can feel more distinctly the amount of strain we put on the tissues, can more delicately prevent too rapid expulsion of the head during parturient effort and make traction when the effort is passing off, and can all the time be sure that the head is progressing in the safest direction.

When the head is born the fixation screw is first relaxed and the right traction-rod unlocked, and then each blade can be slipped off in turn.

I may sum up these remarks in the following propositions:—

I. The extraction of the fœtal head through any part of the curved parturient canal demands the use of a forceps having the pelvic curve (curve of Smellie and Levret).

II. Extraction with such an instrument cannot be made without loss of power and mis-direction of power, unless the handles have a compensation curve (perineal curve of Johnstone, Moralés, Hubert, and Aveling).

III. The addition to the blades by a joint or hinge of compensationally curved traction-rods gives the possibility of correct axis-traction, while the change impressed on the direction of the fixed application-handles affords an index to the operator as to the line in which at any moment he ought to pull (axis-traction rods of Tarnier).—*Edinburgh Medical Journal, Oct.* 1883, *p.* 289.

53.—TRACTION WITH FORCEPS DURING AN INTERVAL.

By Henry Lowndes, M.K.Q.C.P.I., Consulting Surgeon to the Northern Hospital, Liverpool.

It has been up to the present time a recognised rule, with regard to the use of the forceps, that traction should be made during a pain; that we should co-operate with the pain. If pains cease to recur, then we are taught very properly to make traction at suitable intervals without them. Is this rule, then, that instructs us to make traction during a pain, a sound and wise one? I have for some time been gradually coming to the conclusion that the indentations the forceps sometimes so distinctly impress on the infantile head are greatly due to this very rule, and I have a strong suspicion that to the observance of this rule are due many of the abrasions and fissures of the cervix that we see. I will suppose a case where we have thought it well not to wait for the complete dilatation of the os uteri: we are told to make traction during a pain, that is to say, at the moment the head is pressed firmly down against the orifice of the womb; the blades are thus firmly compressed between the cervix and the turgid head to the manifest detriment of both, and our extracting power is exerted, not on the head alone, as it should be, but on the head and the uterine cervix welded for the moment together.

I am in the habit of using the forceps in a very large proportion of my primiparous cases, and of applying them pretty early, often before the os is fully dilated, and for more than two years I have made traction only during the interval. During a pain I allow the handles of the instrument to go as far apart as they will, just taking care it does not slip out—of which indeed there is not much fear. During each interval I make one or two, or perhaps three, gentle attempts at traction, usually with one hand only, and after each effort I allow the handles to separate widely. The forceps used in this way in cases of uncomplicated labour occasion practically hardly any pain, and I do not, as a rule, give chloroform. They may be used in this manner for a considerable time, if necessary, without fear of indenting the head or injuring the mother. When the head is presenting at the vulva, and the pains are still strong, it is sometimes well not only not to use traction during a pain, but even gently to hold the head back with the forceps, and then, when the perinæum seems sufficiently dilated, to extract during an interval.

The forceps used with a gentle hand in the manner I have described, and applied pretty early, shorten very much the duration of labour, and to the same extent ensure a favourable recovery. In the four last primiparous cases I have had labour was over within ten hours from the commencement of regular pains, and there was a complete absence of that exhaustion and prostration which so often accompany a first labour.

I published an "obstetrical memorandum" on this subject in July 1881 (*Retrospect*, vol. 84, p. 323). I cannot flatter myself that I persuaded anybody, but my views had at least the honour of being criticised. Two principal objections were made,—first, that this method was impracticable, because the very act of traction must bring on a pain; secondly, that it was non-natural,—that the natural and reasonable thing is to co-operate with nature's efforts, and not to try to supersede them.

To the first of these objections I can only reply, that in my own experience traction does not bring on a pain; it brings on certain phenomena that might be mistaken for a pain, but it does not as a rule produce uterine contractions. The patient feels something going on, and forces down perhaps as if there were a pain, but if you tell her to be passive she can be so, and she will be of her own accord when she is a little used to the traction. Let us only consider how difficult it is by any means whatever to bring on a real pain when we want it. Nature will not be disturbed from her mysterious rhythmic course. With regard to the second objection, we must remember that the use of the forceps is altogether non-natural. We wish to draw out the child from the uterus and pelvis; nature wishes, if I may be allowed the expression, to squeeze it out.

We can pull, and nature can squeeze, but the two processes I submit are better not gone through at the same moment.

The rules which guide us in our practice of the obstetric art are for the most part so admirable that one hesitates before advocating a change in a single one, yet I cannot help venturing to hope that it may in time become an established rule *not* to make traction during a pain.—*Liverpool Med.-Chirurgical Journal, July*, 1883, *p*. 302.

54.—ON THE USE OF ANÆSTHETICS DURING LABOUR.

By Thomas D. Savill, M.D.Lond.

I ask attention to the following three questions:—1. What are the advantages and disadvantages of the use of anæsthetics during normal labour? 2. What are their advantages and disadvantages during abnormal labour? 3. What is the best kind of anæsthetic to use, and the best mode of administration?

1. In *normal labour*. Many years ago this subject had a moral aspect, and I am told that the question still exists in the minds of the laity. but we need scarcely stop to discuss it now. The pains of even healthy labour are in some cases very severe, producing at times what almost amounts to delirium. Are we not then justified in giving some form of anodyne, just as we would for a neuralgia? Provided we avoid certain risks, why should we not assuage the pain in the one as well as in the other? In these days of scientific medicine, when we are so far in possession of the knowledge of the conditions and sources of danger, we can with greater boldness employ agents for the relief of suffering which, in darker times, we rightly hesitated to use even for the necessary treatment of disease. Moreover, pain is a depressing agent in itself, and lowers the vitality of the sufferer; and we ought, on this account, to relieve it where possible. Of course, it behoves us first to become acquainted with the risks we run, and to see that they are reduced to a minimum. But the relief of pain is not the only advantage which anæsthetics have in normal labour, for they also obviate a tendency to certain complications. Rigidity of the cervix, and other irregular uterine contractions, depending on functional causes, are less likely to occur when chloroform has been given, even to a slight extent; and the indirect good thus done is equivalent to all the advantages of a speedy over a tardy labour. Again, in some women there is an inherent predisposition to puerperal convulsions, so justly dreaded by the obstetrician; and this tendency anæsthetics will counteract by quieting the nervous system, and abolishing the pain which acts as an exciting cause.

It is right, however, that we should bear in mind the objections that there are. The first, and indeed the only formidable one, is the tendency to produce *post partum* hemorrhage. It is now well established that both ether and chloroform, when given to the full extent, produce great relaxation of the muscular tissues throughout the body—voluntary and involuntary. About the voluntary, anyone can assure himself; and that the organic muscles also share in the general relaxation, is evidenced by the diminished vermicular movements of the intestines of an animal after death; by the dilatation of the pupil which occurs after the initial stage of administration; and by the diminution, and sometimes abolition, of the uterine contractions, which occur when the full effect of either of these drugs is induced. It is in this way that they hinder nature's method of closing the uterine sinuses after the separation of the placenta, and then flooding occurs. How to obviate this untoward result should be one of our chief aims, when an anæsthetic has been used.

By interfering with the uterine contractions before expulsion of the fœtus, labour becomes somewhat prolonged. And, further, all anæsthetics (but especially ether) are apt to be attended with troublesome vomiting, and followed by headache and depression.

You will notice that all these evils arise from complete anæsthesia. Partial anæsthesia is not attended by them, if other conditions be favourable; and I believe it is this fact which will explain the discrepancy between some of the statements as to the effect of anæsthetics on the uterine contractions.

2. Let us turn now to the case of *abnormal labour*. By that, I mean labour that is complicated in some way, or necessitating some form of operative interference.

Here, besides relieving pain, an anæsthetic greatly facilitates manipulations of all sorts. That very relaxation which is otherwise an evil is here of great use; especially is it so in the operation of turning. Of all operations, perhaps, it is more advantageous in cases of version than in any other; but at all times, whether for craniotomy, cephalotripsy, high forceps operation, or the introduction of the hand into the uterus, fully induced anæsthesia gives great assistance to the operator, and much ease to the patient, enabling her to undergo the operation without movement or shock. Again, besides obviating a tendency to the two complications—spasm of the cervix and puerperal convulsions — chloroform constitutes the best and speediest mode of treatment for both of these conditions when they arise; the first by relaxing tissue, and the second by abolishing the reflex excitability of the nervous system.

The disadvantages are—1st, The great tendency to the production of *post partum* hemorrhage as already mentioned; and

2ndly, A fresh one—in the way it muffles and obscures the pains, so that we cannot tell the precise moment to aid nature with our efforts. This applies mainly to the group of forceps operations.

3. We now come to the question: *What is the best anæsthetic to use and the method of its administration?* The division of cases into normal and abnormal has a practical application; for in normal cases it is given solely with the object of relieving pain, and it is quite unnecessary to push the anæsthetic to loss of consciousness; but in abnormal cases, besides relieving pain, it is given as part of the treatment, and complete anæsthesia must be induced.

The best kind of anæsthetic to use has hitherto been pretty well agreed upon; for, although many drugs have been suggested, chloroform has justly carried off the palm. Of the two commoner anæsthetics, chloroform and ether, we know that, whereas chloroform tends to produce death suddenly by cardiac paralysis or syncope, ether, in most cases, tends to death by choking up the lungs or larynx. In the fatal syncope of chloroform, all is over in a moment; artificial respiration or anything else is of little or no avail. But, in the asphyxia of ether, by pulling the patient's tongue forward, rolling him over on his side, and, lastly, by artificial respiration, we can almost always restore him. And this constitutes the only, though great, advantage of ether over chloroform in ordinary cases. But these arguments do not hold in labour, for it is now well known that chloroform has but little tendency to the production of fatal syncope in pregnant women; a fact which may be accounted for, partly by the cardiac hypertrophy that always accompanies pregnancy, and partly by the absence of anything like terror in the excitement of the moment. On the other hand, the disagreeable irritation of the lungs which ether produces, and the struggling and length of time it takes to produce anæsthesia (especially in unaccustomed hands) constitute very great objections to its use in parturition. Some, however, still prefer it, and no doubt it is of much value when for some reason chloroform cannot be given. Methylene dichloride has been tried, and found wanting: and you will find the merits of nitrous oxide expounded by Dr. Macan in the Journal for Feb. 2nd of this year. Chloral is useful during the first stage—at which time chloroform is not advisable—and is warmly supported by Dr. Playfair. Its action is the same as chloroform, and it is safer, but it is also much less speedy and efficacious.

The method of administration of chloroform must differ according to the purpose we have in view. If the relief of pain be our only object, its partial administration may be effected either by giving the crude drug in small quantities, or by diluting it to the appropriate strength with alcohol. This latter method has the advantages of being safer and more exact. The alcohol, also, in some degree, counteracts the depressing influence of the chloroform. I believe the most convenient proportions to be equal parts by measure of chloroform and rectified spirit; and there are two small practical points worth note: (1) the addition of some aromatic serves to make the mixture more agreeable, perhaps to prevent sickness, and to avoid confusion with pure chloroform; (2) add the chloroform to the spirit, so as not to get a precipitate.

Concerning the inhaler, the simplest is the best. A perforated box with a pad of lint inside, or handkerchief folded will do, or Skinner's inhaler and drop-bottle are convenient. There is no need for a special administrator in these cases; the patient can give it to herself. Direct her to take half a dozen deep inhalations, and then, as she becomes drowsy, the inhaler drops off, and the administration ceases. An useful test of the effect produced is her power of conversation.

In normal cases chloroform should not be given in the first stage, when it materially interferes with the mechanical dilatation of the os. In the second stage. it may be given at any time, and becomes especially necessary towards the end, as the head passes the vulva. Much of the success, or the reverse, depends upon the precise moment at which the administration is stopped. If too early, the patient is unrelieved during the most painful period of the whole labour; if continued too long, you run the risk of hemorrhage. In the third stage, it is not called for at all, except, perhaps, in some cases of retained placenta from hour-glass contraction.

In abnormal cases, where it is desirable to produce complete anæsthesia, the crude drug must be administered; and it is of the utmost importance for one person to devote his attention entirely to the anæsthetic. The mode of administration differs in no way from ordinary cases, except, perhaps, for the length of time it may be given.

In conclusion, allow me to indicate, by way of summary, what I believe to be the main precautions, whose observance would render the use of chloroform perfectly justifiable.

1. There are certain women who have a tendency to flood at every confinement, and others in whom there seems an already too great relaxation of fibre—weak anæmic females in their eighth or tenth confinement; and to these it would be unadvisable to give chloroform, except for necessity. Happily, it is not these women who suffer the most pain, but rather those strong healthy primiparæ whose pelves and general build approximate to the masculine type.

2. We should not give it when labour is complicated with

severe vomiting, or with acute disease of the heart or lung, unless there be imperative call for it.

3. It should not be given to the full extent, except for operation, convulsions, or spasm of the cervix; and then it is most necessary that one person should devote his entire attention to it.

4. The inhalation should be stopped directly we find the pulse becoming very weak, or the respiration irregular.

5. Anything which makes us suspect a fatty or enfeebled cardiac wall should make us cautious in the use of chloroform. Here, as in cases other than those of labour, it is not the most extensive valvular disease (so long as it be attended by compensating hypertrophy), but the atrophied or degenerate wall that constitutes the source of danger. Unfortunately, the signs of these conditions are subtle and uncertain; but a fatty heart may be suspected by an exceedingly feeble cardiac impulse, combined with an almost inaudible first sound; or attacks of dyspnœa, vertigo, and syncope, in the absence of anæmia, or valvular lesion; or the copious deposit of fat in other parts of the body, and the occurrence of dropsy without adequate cause. A dilated heart may be suspected by increased area of præcordial dulness, combined with epigastric and venous pulsation, and a want of correspondence between the violence of the cardiac impulse and the strength of the pulse. Pericardial adhesions also form a great source of danger. They may be suspected when the heart's apex is fixed above its normal position, and does not shift with respiration: or when there is depression instead of protrusion of intercostal spaces over the position of the apex, giving a wavy character to the cardiac impulse.

6. The sixth and last precaution I would mention is this. In all cases we should take extra care to prevent the occurrence of hemorrhage after birth; by giving a full dose of ergot in a little warm water when the head reaches the perinæum; by ceasing the chloroform immediately it is born; and by rousing the patient from her lethargy as soon as possible.—*British Medical Journal, May* 12, 1883, *p*. 903.

55.—ON THE TREATMENT OF POST-PARTUM HEMORRHAGE BY HYPODERMIC INJECTION OF ERGOTININE.

By C. Chahbazain, M.D., Paris.

The question of the treatment of post-partum hemorrhage is one of the most important in midwifery. A quick, steady, and permanent contraction of the uterus is a condition *sine qua non* for checking uterine hemorrhage after delivery. This can be obtained by hypodermic injections of ergotinine.

What is ergotinine, and how does it differ from ergotine? Ergotinine is the alkaloid of the ergot of rye, as quinine is the alkaloid of quinquinia, or morphia that of opium, while under the name of ergotine are known different products of ergot—that of Bonjean, Yoon, Wigger, Wenzell, and the extract of ergot of the B. P., these are simple extracts of ergot of rye. It was discovered by Charles Tauret, the distinguished chemist of Paris, in the year 1875, and the name "ergotinine" was given by him in order to distinguish it from the ergotine. The composition of ergot is very complex. Chemists have discovered not less than twenty-four different substances, but the real alkaloid, with all the properties and chemical reactions of the vegetable alkaloid, was discovered only by Tauret. This alkaloid is in form of white crystals, insoluble in water and soluble in alcohol and chloroform. The mode of preparation and the chemical and physical characters of ergotinine cannot be discussed here, those who may be interested in the question can have a perfect notion on these points by consulting the paper of Tauret in the Annales de Chimié et de Physique, 1879. In order to show the extreme force and the powerful effect of this alkaloid, I will only say that one pound of the fresh powder of the ergot of rye gives only three grains of the crystallised alkaloid.

Ergotinine was first used against hæmoptysis and hæmatemesis, afterwards against every kind of hemorrhage, in other words, whenever there was an indication for the use of ergot. My friend and master, Dr. Budin, of Paris, has used ergotinine in some cases of post-partum hemorrhage, and obtained very good results, but unfortunately these results are not yet published.

I had lately a very good opportunity of using the ergotinine in a hospital which has a universal and traditional reputation in our obstetrical science—I mean the Rotunda Lying-in Hospital of Dublin. I thank Dr. Atthill, the master of this hospital, for the kind permission that he gave to me for testing the efficacy of this alkaloid. I could not have chosen a better place for using that medicine: in the first place, because of the great number of cases which are attended in this hospital, natural as well as complicated (in fact, during the three months that I passed there, the cases of post-partum hemorrhage were not unfrequent); and, in the second place, for the control which each case has naturally undergone by the presence of the assistants and of young doctors who attend the hospital. I give a great importance to this second point, because I think that such investigations must be done before medical men and not simply in private practice.

In what cases may ergotinine be used? What are its advantages over ergot and ergotine? In what doses and how must it be used? These are the questions which we shall now discuss.

The alkaloid of ergot must be used in every case of post-partum hemorrhage due to the absence of uterine contractions, or when after a good contraction there is a relaxation of the organ. Naturally, when there is a retained placenta this must be first removed, and if the hemorrhage does not cease the ergotinine may be used hypodermically. The following is a case of this kind:

Case 1.—Mc., æt. 39, fifteenth pregnancy, admitted to the Rotunda on the 10th August, 1882. She is at full term, and a child is born after six hours' labour. No hemorrhage during the pregnancy. Fifteen minutes after the birth of the child some blood with clots came away. The expression of the placenta was attempted, but a great quantity of blood and clots was expelled without the placenta. Some traction of the funis was tried without result. The patient was continuously bleeding, the pulse becoming frequent and weak, and the uterus quite enlarged. I introduced my hand into the uterus, having the other hand on the abdominal walls, and with great difficulty I detached the placenta and the membranes, which were very adherent to the walls of the uterus. I waited for a contraction in order to have my hand expelled from the uterus with the placenta. This contraction came some minutes after, expelling the placenta and my hand, but the uterus relaxed immediately after, and a great rush of blood came away and filled a big basin. I injected then ten minims of the solution of ergotinine (containing only $\frac{1}{200}$ of the alkaloid) in the gluteal region. Soon after I felt the uterus contracting under my hand, placed on the abdominal walls, the bleeding ceased, and did not come any more. The binder was put on, the patient kept quiet, and brandy ordered. The patient recovered after slight symptoms of septicæmia, but no local accident, neither any bleeding occurred.

I anticipate the objection that may be raised by the introduction of the hand into the uterus, but the contraction produced by it did not last long and relaxation came on; the ergotinine produced a steady and permanent contraction. In the following cases the hand was not introduced into the uterus and the ergotinine acted very well.

Case 2.—Genville — , æt. 27, fourth pregnancy. Has had some post-partum hemorrhage at her last confinement. Labour easy, lasting six hours, on the 20th of August, 1882. Placenta expelled naturally. Bleeding began immediately after the placenta was expelled. Ergot given by mouth, one ounce of the infusion; local application of cold water tried without result. Bleeding continued always by drops. Uterus softened, not well contracted. One hour after the ergot was given by mouth the bleeding continued and the uterus became more relaxed. I injected ten minims of the solution of ergotinine in the gluteal region and a strong contraction came on soon and the bleeding ceased. I stopped for more than half an hour near the patient and not a single drop of blood came on the vulva. No local accident.

Case 3. Mrs. R—, æt. 22, primipara. Tedious labour, lasting twenty-six hours; placenta expelled fifty minutes after the child was born. Some laceration of the perineum. Bad contraction; hemorrhage. Ergot given by mouth (liquid extract, a teaspoonful); continuous trickling of blood from the uterus for more than one hour after the ergot was given. I injected hypodermically eight minims of the solution of ergotinine in the gluteal region. Very good and strong contraction. Some drops of blood came from the laceration. No more bleeding. No local accident.

In the following case a good contraction came on after delivery, but some minutes later it was replaced by a relaxation, and ergotinine brought back the uterine contraction.

Case 4.—X., æt. 41, eighth pregnancy. History of tedious labour previously; last pregnancy great difficulty in removing the placenta; hemorrhage. Application of forceps on 25th of August, 1882, after eight hours of second stage, the head being on the perineum. Expulsion of the placenta by expression twenty minutes after. Good contraction of the uterus lasting a few minutes, then relaxation; hemorrhage with some clots. Ten minims of the solution of ergotinine injected in the gluteal region. A strong contraction came on and the hemorrhage ceased. No local accident. No secondary hemorrhage.

[Several other cases are given by Dr. Chahbazain.]

In Case 9 (one of secondary hemorrhage) three drops of the solution were sufficient. Generally I used 10 minims, which correspond to $\frac{1}{100}$ of a grain of the alkaloid, or one half of a milligramme. The solution of ergotinine prepared by Tauret himself is $\frac{1}{50}$ of a grain (1 mill.) to 20 minims. Here is the formula of his solution which he sent to me lately. ℞. Ergotinine, 0·01 centigramme ($\frac{1}{6}$th of a grain); lactic acid, 0·02 centigramme ($\frac{1}{3}$rd of a grain); aqua laurocerasi, 10·00 grammes (3 dr.).

Dr. Budin began to use 20 minims of the solution ($\frac{1}{50}$ of the principle) and he obtained very bad vomiting, and real accidents of intoxication occurred in the cases when $\frac{1}{10}$ of a grain of the artificial principle was used. But what is very curious to remark, that in small doses the effect of ergotinine on the uterus is far better and stronger than in high doses. In all cases that I used I never injected more than 10 minims of the solution ($\frac{1}{100}$ of a grain of the alkaloid), and I never obtained either local or accidents of general intoxication. I have always used the ergotinine hypodermically, pushing the needle of the syringe very deep in the muscles of the gluteal region.

Like the solution of morphia the solution of ergotinine is very difficult to keep; it must be kept in a dark-coloured bottle, and if there is some deposit, it must be filtered with a small piece of cotton kept at the end of the needle. There is also a syrup of ergotinine prepared by Tauret, dose $\frac{1}{25}$th of a grain to the ounce; it is used in chronic menorrhagia and in profuse menstruation, from one to six teaspoonfuls during the day. I have never used it because of the slow effect that it has for arresting post-partum hemorrhage and also for the fear of producing some vomiting.

Now, what are the advantages of ergotinine over ergotine?

1. Local abscesses and indurations are often observed after hypodermic injection of ergotine, while the ergotinine has not yet produced such an accident.

2. It is necessary to inject 20 to 40 minims of the ergotine of Bonjean or the liquid extract of B.P. in order to obtain a good and strong contraction, while with three to five drops of the solution of ergotinine a powerful effect is obtained.

3. Ergotine being a very complex product, its action is also complex and is not permanent, while ergotinine the real active principle, the alkaloid, acts more quickly and produces a more steady and permanent contraction than the former.

4. The action of the ergotine given by the skin on the uterus is not certain, while that of the ergotinine has not yet failed.

Ergotine corresponds to the extract of opium, ergotinine to the morphia. No one discusses to-day the advantages of morphia over the extract of opium. I give generally now four or five minims of the solution, and if I do not obtain a satisfactory result I give five minims more.

As a general rule I never use the ergotinine when the uterus is not empty, but under peculiar circumstances I make some exceptions. In the following case and in Case 10, I injected it before the placenta was expelled, because of the hemorrhage, and as a prophylactic against post-partum hemorrhage. It is worthy of remark that in the following case the placenta was expelled like a gun-shot immediately after the injection of seven drops of the solution, showing its tremendous action on the uterus.

Case 11.—D., æt. 34, eighth pregnancy. Contracted pelvis, head on the brim and very mobile. Has had some hemorrhage one hour before the labour began. Forceps applied without effect by Dr. Horne on 25th of September, 1882, after eighteen hours of labour. Podalic version performed and a small child extracted. Immediately after the child was born bleeding came from the uterus. I injected seven drops of the solution; a strong contraction came on, stopped the hemorrhage, and expelled the placenta with the membranes, throwing them to a certain distance. No more hemorrhage. No local accident.

I used the ergotinine in the following case as a prophylactic treatment for post-partum hemorrhage, the uterus not being empty.

Case 12.—C—, æt. 25, fifth pregnancy; three days in labour—twins. First child extracted by turning, being an arm presentation; great quantity of liquor amnii. I injected three drops of the solution in the gluteal region, there being some bleeding. A good contraction came on and expelled the second child; the placenta expelled in fifteen minutes by expression. One placenta, separate membranes. No post-partum hemorrhage. No local accident.

When the question of intra-uterine injection of perchloride of iron was discussed, the distinguished president of this Society, Dr. Matthews Duncan, divided post-partum hemorrhage into two classes:—1. Those which are not very serious and are very frequent. 2. Those which are serious and very rare. It is in that first class of hemorrhage that the hypodermic injection of ergotinine acts with great efficacy. Our pretension does not go so far as to say that ergotinine replaces the intra-uterine treatment of post-partum hemorrhage, though in all cases but one after the hypodermic injection of ergotinine no other treatment had been necessary. But we shall suggest to use the ergotinine before any attempt at intra-uterine injection is made; a good contraction being obtained, the formation of thrombi in the open mouths of uterine vessels is of no more necessity.—*Obstetrical Transactions, vol.* xxiv, 1883, *p.* 236.

56.—ON METRIA, OR (SO-CALLED) PUERPERAL FEVER.

By Lombe Atthill, M.D., ex-Master of the Rotunda Hospital, Dublin.

Metria is a term which includes a number of affections which, though allied in some respects, are in others very dissimilar, but all of which are commonly classed together under the very incorrect title of "puerperal fever."

The pathology of metria is still far from being perfectly understood. Two facts alone are admitted by all who have studied the subject carefully; namely, first, that puerperal women are liable, under certain circumstances, to be inoculated with septic matter conveyed to, and deposited in, the vagina by the hands of the attendants, as well as by other agencies, when, either through carelessness or ignorance, proper precautions have not been adopted to prevent such an occurrence; and that the disease produced by such inoculation is not an unfrequent source of one of the forms of metria; secondly, that puerperal women may be self-inoculated by poisonous matter originating within their own bodies, from the decomposition of blood-clots formed within the uterus after parturition, or of portions of the membranes or placenta which have been retained *in utero;* the only difference of opinion on this point being that Dr. Matthews Duncan and others term the disease thus produced "sapræmia"—that is, resulting from the absorption of putrid matter—thus distinguishing it from "septicæmia," or the disease produced by "organisms which, when conveyed to the blood, multiply indefinitely in it;" while those which are the product of putrefaction "do not survive, far less grow, therein." (*Retrospect*, vol. 82, p. 277).

I hardly think that anyone will dispute the correctness of the foregoing points; they have been established beyond all doubt; and it is certain that poison, introduced into the system by one of the two ways indicated, is the cause, in the vast majority of cases, of so-called puerperal fever, whether occurring in private or hospital practice. But there are many who believe that the whole subject is summed up in a belief of these very important propositions, and who think that to go outside these lines is only to cause difficulty and to create confusion. I admit this; but it seems to me that such an argument is almost an appeal *ad misericordiam*, and that it cannot be admitted for a moment. I believe that, in addition to the two preventable forms alluded to above, we have others; and I ask you to consider whether we have not, in addition to these, two other forms of metria, which it may not be possible to guard against—namely:

1. A form of self-infection, occurring under special conditions, to which I shall allude by-and-bye, which is not preventable by the adoption of any antiseptic treatment;
2. An epidemic, highly infectious, form, which spreads by the same means as ordinary epidemics do.

Before commencing the discussion of these propositions, it is essential to bear in mind that I entirely concur in the opinion now generally held, that septicæmia, occurring in a puerperal woman, is not capable of being communicated to another puerperal patient by any means other than the direct transfer of the infectious matter to some portion of the mucous membrane lining the genital track. Septicæmia, however, when it attacks a puerperal woman, may be spread by various agencies, as well as by the hands of the attendant—for instance, by the nozzle of a syringe, by the use of infected sponges, by imperfectly washed napkins, bed-linen, &c.; but not through the medium of the air breathed by the patient. Of the truth of this I have not the slightest doubt.

You will observe that I have spoken of the two ordinary forms of puerperal septicæmia as being preventable. It is evident that, with thorough cleanliness, and the use of antiseptic precautions, septic poison should never be introduced into the patient's system by the attendants; further, I believe that it is possible to prevent self-infection in a healthy woman, by adopting precautions to insure a good and permanent contraction of the uterus, and by washing out the uterus whenever we have reason to suspect the existence of clots, &c., in it, with a disinfecting fluid. With the former object, I make it a practice to put all patients in whom a relaxed condition of the uterus exists, on ergot, from the moment labour terminates, continuing its administration for at least a week. I believe a relaxed condition of the uterus to be a very common predisposing cause of self-infection in puerperal women; it favours the formation of clots *in utero*, and also, the orifices of the uterine sinuses being left open, the absorption of septic matter is favoured.

In proof that I do not exaggerate the importance of imperfect contraction of the uterus, as a main factor in the production of puerperal septicæmia, I may point out that I recently saw, in consultation, three patients suffering from this affection, in all of whom labour had been so rapid that the child was born before the arrival of the medical attendant; and, it is a well-known fact, that relaxation of the uterus is very liable to follow the too rapid emptying of that organ.

This train of reasoning has led me to believe that imperfect uterine contraction is one of the causes of the frequent occurrence of septicæmia in unmarried women. The mortality from septicæmia amongst them is very great, and there is no doubt but that the great mental distress these poor creatures suffer, interferes with the recuperative process which should take place rapidly in the uterus after parturition. The muscular fibres of the organ do not contract as they should; the blood-supply, consequently, is not cut off, the mouths of the sinuses remain open, the denuded placental site, instead of becoming rapidly restored to its normal condition, becomes unhealthy, and the fœtid discharge which, under these circumstances, takes the place of the normal lochia, enters the system, either directly through the open mouths of the placental sinuses, or is absorbed at the site of some fissure in the mucous membrane lining the genital track. This is one form of puerperal septicæmia which I fear is beyond the reach of preventive treatment. No antiseptic precautions can prevent its occurrence, no treatment that I know of will stay its progress. In patients suffering from certain forms of chronic disease a similar condition is observed, and similar results follow.

In my opinion, the infection arising from any of the forms of metria to which I have alluded, cannot be carried by the attendants from one patient to another, if precautions be adopted to prevent it. And only a year ago I was strongly inclined to believe that epidemics of so-called puerperal fever would not occur so long as such precautions were adopted. Those enforced by me among the pupils attending the Rotunda Hospital were the following.

1. Students attending the practice of the hospital should not undertake *post mortem* examinations, be engaged in dissections, or attend an hospital containing patients suffering from infectious diseases; and

2. Before proceeding to examine any patients, they washed their hands in a solution of carbolic acid.

During the first six years and a half of my mastership, these sufficed to prevent the occurrence of anything like an epidemic of so-called puerperal fever. Deaths from septicæmia, especially among unmarried women, from time to time occurred, but the disease never spread; in August last, however, the hospital being at the time extremely healthy, a patient was admitted who complained of pain in the abdomen, and who vomited constantly, the fluid ejected being greenish. She stated that she had been in labour for more than twelve hours, and that, during the whole of that time, she had been vomiting; and it was subsequently elicited that she had been complaining for some days previously, and also that she had been seen, at the commencement of labour, by some practitioner, who advised her to go into hospital. The os, at the time of admission was about one-third dilated; labour progressed very slowly, and she finally was delivered by the forceps. Vomiting ceased after delivery for a time, but soon recurred, everything swallowed being ejected, with large quantities of greenish fluid. The abdomen became tympanitic, the pain intense, matters went from bad to worse, and she died on the fourth day after delivery. Her appearance strongly resembled that of a patient suffering from typhus fever.

Another patient was admitted on the same day as the last patient, and she lay for a short time in the bed next to her. This patient's labour also was slow, but it terminated by the natural efforts. She was attacked with symptoms of acute peritonitis thirty-six hours after delivery, and almost immediately afterwards we noticed a very peculiar, almost black, appearance of the face. The course of the disease was identical with that of the preceding case, but was even more rapid. The first symptoms showed themselves on the morning of the 29th, and she died on the 31st.

The disease now spread rapidly, and so virulent was the epidemic that, out of twenty-nine women admitted during six days which intervened between the delivery of the first patient and the issue of the order to refuse admission to all applicants, eleven women were attacked, and nine died.

The admission of patients being stopped, the wards were thoroughly disinfected, the walls limewashed, the floors washed with a strong solution of chloride of lime, the cupboards, presses, &c., scoured, the nurses' clothes, as well as their bedding, being washed and aired, and placed in the hot-air chamber. Patients were re-admitted on September 12th, and from that date till the expiration of my mastership on November 4th, during which time 118 women were admitted into the hospital, the health of the patients was excellent, and, I am informed, continues to be so still. No more successful effort to stamp out disease than this was ever recorded. This, and the fact that the epidemic was distinctly imported into the hospital, and that it did not originate in it, are facts as important as they are satisfactory; and though the occurrence of the outbreak was a cause of great distress to me, and though it was a great disappointment that, at the very close of my mastership, such a misfortune should have happened, still these two facts lessened the regret I naturally experienced.

Some years previously, a patient suffering from erysipelas of the head and face was, during the night, sent up to the labour ward, her condition not having been detected till she was being undressed. The child's head was in the perineum, and she could not be sent out. She was at once removed to a separate ward, and early next morning transferred to a fever hospital; but though her stay in the Lying-in Hospital was so short, several patients were attacked, not with erysipelas, but with so-called puerperal fever, and one died. The disease was limited to the one ward. I ask you, gentlemen, to consider what the disease attacking these women was. To me, it seems to have been a disease originating by the introduction into the system of a puerperal woman of the infection of erysipelas, which infection was modified by the peculiar state of the system and of the blood which exists in puerperal women, and which, therefore, developed an apparently different disease; and I am strongly inclined to the belief that outbreaks of so-called puerperal fever, when it assumes an infectious and epidemic form, are due to the introduction of the poison of some ordinary zymotic disease into the system of a puerperal patient, the symptoms being, under such circumstances, totally different from those occurring in cases of septicæmia.—*British Medical Journal, Aug.* 11, 1883, *p.* 259.

57.—OBSERVATIONS ON PUERPERAL FEVER.

By Thomas More Madden, M.D., F.R.C.S.E., Obstetric Physician to the Mater Misericordiæ Hospital, Dublin.

Pathology.—Dr. Atthill's views on this subject appear to have been generally adopted by other recent authorities, many of whom now agree with him in believing that, in the first place, there is no such specific disease as puerperal fever—that is, a specific disease in the same sense as small-pox or scarlatina; secondly, that inoculation or absorption of septic matter from without is a frequent cause of one form of metria, *i.e.*, puerperal septicæmia; and, thirdly, that puerperæ frequently become self-poisoned by auto-infection from decomposition of retained clots, or shreds of membrane or placenta; the result being what some call puerperal sapræmia, in contradistinction to septicæmia. These are Dr. Atthill's views; and his experience has been so great, and his authority is so high, that it is with great regret I find myself obliged to dissent, as I do, *toto cœlo*, from the first of them, and to some extent from the others also. We are, however, met here to arrive at accurate conclusions on debatable questions by the exchange of our individual experiences and views. Hence, having been for upwards of twenty years in practice, and having been for some years connected with the largest lying-in hospital in Great Britain, I have had some opportunity of gaining experience on this subject. I have, therefore, no hesitation in saying that, in common with others who have had similar experience, I am as convinced as I can be of any fact whatever of the existence of puerperal fever or a specific infectious disease peculiar to puerperal women. The entity of this disease is in no way affected by whatever name we may choose to term it; and whether we speak of it as puerperal fever, metria, septicæmia, utero-peritonitis, sapræmia, or by any other appellation, its distinct existence remains as unmistakable as that of measles, scarlatina, typhoid or typhus fever, or any other zymotic disease; although its predominant symptoms are varied, as those of these diseases also are, at different periods, and during different epidemics, by the prevailing atmospheric epidemic constitution, by the general condition of the patient, by the intensity of the septicæmic intoxication in each case, and by a variety of other modifying circumstances.

In considering a malady of such gravity as this, any needless subdivisions or hair-splitting pathological distinctions are, I think, misplaced, and are rather calculated to embarrass than to assist the practitioner who has to deal practically with the different aspects of the disease at the bedside of the puerperal patient. Hence I think we should still retain the old name of puerperal fever, as most generally applicable, and conveying no debatable theory.

Causes of Puerperal Fever: Infection, Auto-inoculation, Hospitalism, &c.—With regard to the causation of puerperal fever, several much disputed questions present themselves. For my own part, I regard puerperal fever as a zymotic infective disease, prevailing periodically as an epidemic, and being, moreover, endemic in some places, under certain circumstances.

It is unquestionable that the disease may result from infection with the poison of other zymotics, such as erysipelas, scarlatina, and typhus fevers, as well as be induced by auto-inoculation with septic matter self-generated in the patient's system, or by hetero-inoculation with septic matter introduced from without. Dr. Burdon Sanderson's views with regard to the gradually increasing virulency of successive inoculation with the exudations of peritoneal inflammation, have been gradually accepted by pathologists. According to this doctrine, if the exudation of a simple peritonitis be injected into the peritoneum of another animal, the disease assumes a more active form in the second than in the first instance; and so on gradually develops its intensity, until at last a virus is reached of the virulence of malignant peritonitis in the human subject. This gradual evolution from traumatic infectivity to the intensified virulence of malignant septicæmia, concludes Dr. Sanderson, teaches plainly what we could not otherwise learn.

The same view is also deducible from clinical experience. Thus, in the Dublin Lying-in Hospital, before any epidemic outbreak of puerperal septicæmia, a few sporadic cases of puerperal fever are noticed to occur, at gradually shortening intervals between them. These cases are usually at first of a mild type, and most of the patients primarily attacked recover. Soon, however, the number of the cases and the virulence of the disease increase, until the hospital at last becomes the hotbed of epidemic puerperal septicæmia, from which recovery is exceptional, and which cannot be arrested until the institution has been closed for some time.

It would, therefore, be impossible to glance, however briefly, at the etiology of puerperal fever, without some reference to the alleged influence of lying-in hospitals in the epidemic spread of this disease. For many years I doubted that these hospitals had any bad influence; and, in former discussions on this subject, I took part in maintaining that even the largest institutions in which lying-in women are aggregated could be, by proper hygienic management, conducted without any fear of their ever proving centres of epidemic puerperal disease; and I only regret that, with my present experience, and from a full review of the facts bearing on the subject, I can no longer hold this view. The mortality caused by puerperal fever in the population at large, great as it is, amounting, as I have already observed, to about one death in every 500 deliveries, is fearfully exceeded in all special lying-in hospitals, in which large numbers of puerperal women are aggregated together. In these institutions, the germs of septicæmia are developed with a rapidity and attain a virulence unknown under any other circumstances. Thus, in the two Dublin lying-in hospitals, the mortality from puerperal fever is now five times larger than in extern deliveries in the population at large throughout England, as shown by the last reports of the Registrar-General and of the Hospital Board of Superintendence.

There is unquestionably much to be said in favour of large lying-in hospitals, such as that admirably managed institution, the Rotunda Hospital, which is an enduring monument of the self-sacrificing charity of its founder, a member of our profession, and is the justly revered Alma Mater of the Dublin School of Midwifery, which has done so much for the progress of obstetric science. But vast as are the benefits that have been conferred by great maternity hospitals such as this on innumerable women in their hour of direst trial; countless as may have been the lives therein saved from all the emergencies of child-birth; great as is the utility of such institutions as centres of obstetric education; yet all these considerations are, I fear, outweighed by the fact that puerperal fever therein finds its favourite *habitat*, and that its virus radiates thence at certain intervals in outbursts of epidemic malignant puerperal septicæmia.

Amongst the causes of puerperal fever, some reference should be made to laceration, during labour, of the cervix uteri. This accident, especially where the injury has been occasioned by the abuse or premature employment of the forceps before the natural dilatation of the os, is probably a very important, though generally entirely unrecognised, factor in the modern etiology of puerperal septicæmia. Under such circumstances, the danger of rupturing the undilated parts is self-evident. And it is equally obvious that thereby is afforded a ready channel for the auto-inoculation of the patient with any septic poison existing in the lochial discharge, which may be absorbed through the raw edges of the lacerated surfaces, and thus give rise to septicæmia. There can be no question as to the toxic effect of inoculation with even apparently healthy lochial matter; and, therefore, much more likely is this to occur when the lochia are in an abnormal or vitiated condition, as is so generally the case a few days after difficult and instrumental deliveries.

Treatment.—There can be no question of the general fatality of epidemic puerperal fever; but still, we have improved considerably in our treatment of this disease, as shown by its result. It is not so very long since an eminent obstetrician reported that he would quite as soon be called to a case of hydrophobia as to one of puerperal fever. I remember hearing the late Dr. Stoker, in the course of a discussion on this subject, saying that, during an extensive practice, extending over forty years, he had very frequently been called in consultation to cases of puerperal fever in the later stages, and that during this long period he had never seen a single instance of the kind in which the patient recovered. Now, I am sure that there is no practitioner present who, thanks to the recent progress of obstetric medicine, has not been enabled to treat successfully at least some of those cases which, only fourteen years ago, proved uniformly fatal in the practice of one of the most eminent physicians of his day.

The treatment of puerperal fever must be governed by the predominant symptoms of each case, and depends largely on the prevailing epidemic type of the disease, which varies widely at different times. Even within the comparatively short period included in my own obstetric experience, several changes have taken place in the prevailing type of puerperal fever in successive epidemics, and hence in the treatment required. We now seldom, if ever, meet with the true inflammatory utero-peritonitis, for which, in my student days, mercury with opium, and free depletion by leeching, were almost invariably prescribed. I well remember often seeing the puerperal patient's abdomen covered, under such circumstances, by what the late Dr. McClintock graphically described as a poultice of leeches. And, I may add, that I have still a lively recollection of the benefits derivable, in appropriate cases, from this line of treatment. Within the last fifteen or eighteen years, however, I have never seen a case of puerperal fever in which any form of depletion could be tolerated; the disease having now, in common with all others, assumed an asthenic, or typhoid, form, and like them appearing more in the character of a septicæmic, than of a true inflammatory malady.

Thus, when, some years after my first acquaintance with the practice of the Rotunda as a student, I became one of the medical staff of the same hospital, two forms of puerperal fever came before me; one with marked uterine pain and tenderness and abdominal distension, and the other without any localised pain; both accompanied by a low typhoid condition tending to death, and obviously requiring stimulation, and especially the free use of turpentine by the mouth, by enemata, and by external application in stuping the abdomen. The form of puerperal fever now most frequently met with is distinctly remittent in its type. Several cases of this kind have come under my observation in which the fever was of the tertian character. Still more usually, however, there are daily matutinal remissions. Thus the temperature and pulse in the second week of the illness often fall each morning to little above normal, and again rise throughout the afternoon, until in the evening the former has reached 105°, and at the same time the pulse becomes above 120.

In the treatment of the remittent forms of puerperal septicæmia, our main reliance must be placed in quinine. This should be given in medium doses of from three to four grains at short intervals of three to four hours, and continued until the pulse and temperature have been sufficiently reduced, and cinchonism has been maintained for some days.

I may here repeat that, with very few exceptions, all the cases of puerperal fever I have recently seen were of an essentially asthenic type, presenting all the symptoms of so-called malignant puerperal fever or septicæmia, and, consequently, were not suitable cases for any form of depletion; but, on the contrary, required the free use of stimulants and nutriment.

Whatever other treatment may be indicated, however, the use, twice daily, of warm antiseptic intra-uterine and vaginal injections is essential in every case of puerperal septicæmia. The use of such injections, for the purpose of thoroughly washing out septic exudations from the cavity of the uterus, is self-evident. But, at the same time, it should be said that they require to be used with far more caution than is generally practised. Nor should we ever fail to impress on the nurse, in such cases, the risk of probably injecting virus into the open uterine sinuses; or, on the other hand, of forcing the injected fluid through the patulous Fallopian tubes. I have more than once seen injury caused, in both these ways, by want of such caution in the use of the ordinary siphon syringe.—*British Medical Journal, Aug.* 11, 1883, *p*. 261.

58.—ON ALEXANDER'S OPERATION FOR PROLAPSUS AND RETROVERSION OF THE UTERUS.—FOUR CASES.

By W. Macfie Campbell, M.D., M.R.C.S., Surgeon to the Northern Hospital, Liverpool.

To Dr. Alexander, of Liverpool, is due the suggestion to expose and shorten the round ligaments as a means of controlling the position of the uterus,—an operation which has been singularly successful in the hands of its author, and which bids fair to be acknowledged as one of the noted advances in gynœcological surgery of this generation.

I have operated upon four cases, two for prolapse, and two for retroversion, and the description of these cases in detail may be of use in determining the cases in which the operation is and is not suitable. One case—prolapse with cystocele—is no better for the operation, and is of a kind I would avoid again, for reasons which will be seen in the description of the case. The stages of the operation, which have been fully given by Dr. Alexander (*Retrospect*, vol. 87, p. 392), may be briefly summarised as follows :—

1. Incision, commencing at the spine of the pubes, extending outwards obliquely, for 2 or 3 inches according to the stoutness of the patient. N.B.—The pubes must be shaved.
2. Exposure of the external abdominal ring, and division of the intercolumnar fibres.
3. The round ligament to be sought for, lying just below the opening, close to Poupart's ligament.
4. The ligament to be seized, and gently drawn downwards and inwards.
5. When both sides have been treated this way, the uterine sound is passed and the uterus placed in a normal position.
6. The round ligaments to be drawn up till the uterus is felt to be held in the new position, and sutured by stout cat-gut passed through skin, external pillar of ring, ligament, internal pillar, and skin, and knotted externally. (I have used two such sutures to each ligament.) The wound is then closed with ordinary silver sutures, and the whole dressed with carbolic gauze.
7. Before the patient leaves the table a suitable Hodge's pessary should be adjusted to prevent undue strain upon the ligaments during healing.
8. The dressing should be changed next day, and afterwards every other day. No special after-treatment is required.
9. The horizontal position should be kept up until the wounds are healed. The uterus should be examined before going about, and it is well to let the Hodge remain in position for the first week after leaving bed.

Case 1.—Mrs. M., æt. 36, admitted under care of Dr. Caton, January 1882, suffering from severe asthma, recurring at intervals during the last five years. The attacks seemed periodic, just before each menstrual flow ; and as she also complained of bearing-down pains, Dr. Caton asked me to examine her. This I did on August 1, and found extreme retroversion, with prolapse in the first degree. The uterus was freely movable, and was replaced with the sound, a Greenhalgh pessary being fitted. She coughed this out in a few days, and her history during the next few months was that of replacing and displacing various pessaries, including the vulcanite stem. Benefit was undoubtedly received while the uterus was in position, and this encouraged me to advise Alexander's operation. She was transferred to my care on December 4. Next day she was placed under ether, the pubes shaved, and the operation already described carried out. The left ligament was found to be at least twice the thickness of the right. Both were shortened to the extent of 1½ inches, or until the uterus was in a slightly anteverted position. On the second day the thick cat-guts securing the ligaments were loosened to relieve tension on the skin. On Dec. 8 her temperature was 100°, above which it never rose. Menstruation commenced on this day, and lasted to the 16th, was much easier than usual, and not accompanied by so much asthma. On the twelfth day after operation antiseptics were stopped, as the wound was all but healed, and she was allowed up at the end of the month. She was transferred to the medical wards on January 13, with the symptoms referable to the displaced uterus quite relieved. The Hodge's pessary was worn until the end of January, when it was discarded, the house physician, Dr. Orr, reporting that the uterus was in the anteverted position, and the prolapse quite cured. I have examined Mrs. M. twice since January, and the favourable condition of parts still continues, notwithstanding severe cough, which still recurs, though Dr. Caton assures me not so badly as before the operation.

Case 2.—Margaret T., widow, æt. 62. Has had three children, the youngest now 27 years old. About ten years ago the womb first came down, and caused but little annoyance until two years ago, when the prolapse seemed to be greater, and a profuse discharge caused much discomfort. She was on her way to the hospital for treatment when she fell, laying open the knee just below the patella, which necessitated nearly a month's treatment. On examination of the uterus it was found prolapsed in the third degree, but easily reducible; the cavity was rather over 3 inches in depth, and no pain was caused by manipulation. The knee being healed; the patient was operated upon under ether on March 29. The right round ligament was found much larger than the other, and exerted a much more noticeable drag upon the uterus when pulled out; neither however, seemed to elevate the uterus very considerably, although altering its axis—a most important gain. The ligaments were transfixed in the usual way, with two sutures to each ligament, and fastened to the ring. When the uterus was replaced a large discharge of moco-pus took place, which had not been seen when examined before. This discharge came from the cavity of the uterus, which was slightly enlarged, and gave no after trouble, disappearing with the uterine displacement. On May 9 she was discharged, with the uterus in good position and quite comfortable, and none of the old dragging pain which had made her former life unendurable.

Case 3.—Margaret C., æt. 32, married, the mother of three children. About three years ago had a miscarriage, and from her description seems to have suffered from some uterine inflammation thereafter. Forcing and bearing-down was a constant symptom after the acute stage had passed, which gradually became worse until external prolapse took place. She was very poor, was unable to lay up, and utterly neglected herself. May 1.—On admission she was very haggard and emaciated, hardly able to walk, and complained of inability to pass water. When examined a globular mass was found protruding from the vulva. This proved to be a cystocele with prolapse of the entire anterior wall of the vagina. The os uteri rested just on the fourchette, and easily admitted a sound to a depth of 3 inches. The vaginal walls were eroded and ulcerated in various places (as though an ill-fitting pessary had been worn), and there was a nasty purulent discharge. A catheter was passed into the cystocele, and the urine withdrawn, which was quite free from ammoniacal odour. In trying to replace the uterus, it only yielded to a certain point, as there seemed to be adhesions posteriorly. I thought, however, there would be enough lift to the womb to relieve the cystocele. This proved not to be the case, as during the operation the uterus could not be moved by dragging upon the ligaments. The operation was upon May 7, and on the 25th the wounds were merely superficial. She suffered a good deal from flatulent distension and symptoms of subacute peritonitis, probably from disturbance of old adhesions, but her temperature was never higher than 101°. There is no improvement whatever in the position of the uterus or cystocele.

Case 4.—Annie L., æt. 50, widow, was admitted May 3, and operated upon on May 8, 1883. According to her own account she has suffered from prolapsus for about eight years, and retroversion for three years, her prolapse coming on suddenly while violently exerting herself in lifting a weight. She had been under the care of Dr. Rawdon, who had been able to give her temporary relief by the use of various pessaries. As there seemed no permanent benefit to be derived from these instruments, Dr. Rawdon asked me to take her in for the purpose of operation. On examination the prolapse was slight, only in the first degree, but the fundus uteri was lying upon the rectum, and there was slight flexion of the canal of the organ. The uterus was easily replaced with the sound, and its movement was free in every direction. At the time of the operation considerable difficulty arose in finding the commencement of the ligaments, as, owing to the great corpulence of the patient, the wounds were extremely deep. When reached, however, complete control was given over the movement of the uterus; they were shortened to the extent of an inch and a half, the uterus being then in normal position. On the third day she complained of pain in the back and dragging upon the right wound, but the uterus retained its position. It was, however, considered better to introduce a small Hodge to relieve the pressure. On the fifth day one of the stitches was removed on the right side, greatly adding to the patient's comfort. She had no bad symptoms, her temperature was never above 100°, and her condition, a month after operation, was—the uterus in perfect position, no feeling of drag or bearing-down, the wounds only superficial and almost healed. The pessary was still retained, and would be until she had been going about a week or so, which she expects to begin shortly.

Remarks.—I am particularly indebted to Dr. Alexander for his kindly allowing me to be present at his operations, and for his assistance and advice in operating upon the cadaver before my first case. Cases 1, 2, and 4 were very satisfactory in every respect; and although in No. 1 the asthma was not permanently relieved, yet she was much better, and her uterus has retained its good position, notwithstanding the frequent cough which distresses her. Case 3 was a failure, and for this reason that it should not have been operated upon at all. Dr. Alexander tells me he has operated with slight benefit upon such cases, but would not again interfere when there were old adhesions. The operation has done the woman no harm, but certainly it has done no good, and I would not again operate upon a case in which I could not put the uterus into normal position with sound and fingers. My experience is confined to those four cases only, but I venture humbly to predict a great future for this operation, and a lasting honour to Dr. Alexander's name in connection with it.—*Liverpool Medico-Chirurgical Journal, July* 1883, *p.* 235.

59.—TOTAL OR PARTIAL EXTIRPATION OF THE UTERUS FOR MALIGNANT DISEASE.

By J. Wallace, M.D., Physician to the Royal Infirmary, and Lecturer on Obstetrics in University College, Liverpool.

1. Under what conditions would extirpation of the (*a*) cervix uteri and (*b*) of the uterus be justifiable, and *vice versâ ?*

2. What are the operative surgical methods most likely to lead to success.

In the first place, it is necessary to remember the pathology of malignant uterine disease, and particularly the form of it generally accepted by Schroeder and others of the German school—namely, that which has been described by Waldeyer—for it has a practical bearing upon the conditions which would lead us to a diagnosis as to whether we should adopt or reject operative interference. Waldeyer "refers the origin of all forms of cancer to true epithelia, considering them all as epithelial tumours, which develop, without exception, from actually existing epithelium," or from "abnormally distributed remnants of the epithelial blastodermic-membrane." Sarcomata, on the other hand, are tumours composed purely of connective tissue. The glandular epithelial cells ramify in and penetrate the deep tissues, force aside the connective tissue-fibres, forming for themselves spaces or alveoli surrounded by a more or less dense stroma. "According, now, to the preponderance of either this connective tissue framework—which is also partly a new formation from the irritated connective tissue—or the nests of cancerous epithelium, we distinguish the harder and softer forms of carcinoma; soft cancer being characterised by a predominance of cells, hard cancer by that of connective tissue."

For surgical diagnosis, we may therefore shortly classify malignant uterine lesions as follows.

1. *Carcinomata.—a.* Scirrhus (slow); *b.* Medullary or encephaloid (acute); *c.* Papilloma or epithelioma.

2. *Sarcomata.*—In amputations or excisions of the cervix for papilloma we have three points to bear in mind; first, the superficial area of vaginal mucous membrane implicated; second, the depth of epithelial glandular cell-infiltration towards the rectum and bladder; and, third, the depth of extension of the papillomatous growth along the cervical mucous membrane towards the uterus and uterine cavity. This latter can only be determined surely by an examination of the part removed, and the naked eye is generally sufficient to do so, at the time of the operation. Prognosis will be confirmed, but not with absolute certainty, by a microscopic examination; for time is the only element which can prove the completeness or incompleteness of removal of the whole of the malignant structures. Papilloma, or epithelioma, the so-called cauliflower-excrescence or cancroid, is the form of disease the early removal of which results in complete cure; but when left to follow its course, the termination is precisely similar to carcinoma. The former begins on the surface, the mucous membrane, while the latter has already made extensive progress in the deeper tissues before it reaches the surface and ulcerates, or fungates. By the time it has done so, adjacent organs have been invaded, and extirpation is of no avail, perhaps worse than useless, according to some authorities; while, according to others, it at least checks the fœtid discharges, stops hemorrhage, and certainly greatly, if not entirely for a time, relieves pain. The operative work of every surgeon is experimentally progressive. I may therefore merely mention in passing, that I have used the *écraseur*, and that it is so frequently followed by hemorrhage, is so dangerous to the peritoneum and adjacent organs, and so often produces shock, which at least once in my

practice has proved fatal, that I have discarded it for amputation of the cervix. The scissors in suitable cases, that is when the disease is not extensive or of long duration, I have found more useful. The galvano-caustic wire I have never used, nor can I imagine, with such large vessels as the lateral uterine arteries sometimes are, that it would control hemorrhage; we might as well discard the ligature, and fall back upon the actual cautery as the hæmostatic, in amputation of the limbs!

The operation which I now prefer is conducted as follows. The patient is anæsthetised, and placed in the lithotomy position, with the buttocks well raised and projecting over the edge of the table, and the pelvis well flexed upon the abdomen. The perinæum is then retracted, and the diseased cervix brought into view. It is seized with vulsellum-forceps, and dragged downwards and forwards, so as to expose the posterior reflexion of cervico-vaginal mucous membrane. With a scalpel, a semicircular incision is carried round through the healthy membrane, at as great a distance as possible from the infiltrated diseased margin. With the handle of the knife and the finger, the posterior surface of the cervix is to be denuded of its coverings, mucous membrane and peritoneum, as high as is necessary. This done, the cervix is next to be depressed backwards, and an anterior semicircular incision made, and the uterus detached from the bladder. The lower margins and insertions of the broad ligaments, with the uterus, can now be felt by the fingers, and the pulsation of the uterine arteries detected. A curved needle is now passed, as high as can be reached, through the ligaments on each side, and the vessels ligatured about half an inch from the uterus. With a pair of scissors, the ligaments are now severed midway between the ligatures and the uterus. The latter is then still more dragged upon, and the cervix is severed with the knife from before backwards, care being taken to grasp the anterior part of the cervix or uterus stump, left behind, by a vulsellum-forceps. The excision is then completed and the removed portion examined, to see if the whole of the disease has been included. The stump and flaps are now washed with iodised water; a sound is passed, *in utero*, as a guide, and the flaps of mucous membrane are brought together by four or five sutures, one or more on each side being passed through the stump of the uterus. The uterus is then steadied by the vulsellum forceps, and the vagina plugged with pledgets of cotton soaked in dilute acetic acid. The vulsellum is then fixed outside the vulva, so as to keep up pressure upon the vaginal plug.

In some cases, where there was difficulty in passing the ligature round the uterine arteries in the broad ligaments, or in securing the vessels and controlling hemorrhage, I have clamped both with Spencer Wells's forceps, and left them *in situ* for thirty-six or forty-eight hours. The forceps lie in the outer angles of the flap-line of sutures—the latter adjusting in apposition the flaps of vaginal mucous membrane.

Although the operation of amputation of the cervix uteri is now recognised as well established in surgery, it is by no means free from the opprobrium of a high mortality. This has been so throughout its history, from the days of Osiander, Huguier, Lisfranc, Dupuytren, Simpson, and others, up till now; and why? Simply because cases are not seen by operators in the early stages of the lesion. This is a point of supreme and vital importance to the poor patient, which cannot be too strongly impressed upon the medical profession, in the almost forlorn hope that they may educate the public, and so lead those who suffer to call for early aid. The mighty importance of this is seen in the following statistics.

From January 1879 to June 1883, four and a half years, I have been consulted by seventy-one patients, suffering from cancer, in the Thornton ward; and, out of that number, only twenty-six cases were admitted in the hope that some form of operative interference would at least give relief, if not cure. In these twenty-six cases, only six were considered fit for what was but a tentative operation at best, for they were all advanced in disease; and, out of six amputations of the cervix, two died and four were discharged, one relieved, three cured, but one of which I saw a year afterwards with the cancer returning in the right extremity of the cicatrix. In private practice, within nearly the same period, I excised the cervix with scissors, and, three days afterwards, applied potassa fusa, in a patient of Dr. Miller, of Birkenhead, who had carcinoma with ulceration. She recovered, became pregnant, was delivered easily, and has since kept free from recurrence. A second case I saw in consultation with the late Dr. Lynn; I amputated the cervix in the same manner, and she was permanently cured. A third case, in consulation with the late Dr. Baker, was the subject of amputation for epithelioma by the wire *écraseur*. The Douglas's pouch was opened, closed by wire sutures, and the patient recovered, to die within twelve months from recurrent cancer. A fourth case I was called to treat, in consultation with Dr. Barfoot of Birkenhead, had the cauliflower-excrescence, and advanced deep cervical deposit, excised after the plan of operative procedure I have described, nearly two years ago, and she remains so far free from recurrence. I could go on, but it would be tediously unnecessary, to recount many other cases seen and operated on long years ago, failures and successes, the whole of which lead me to reiterate, again and again, the vital importance and necessity of seeing and operating upon cases in their initial stages, if women are to be rescued from untold misery and suffering and death.

I have already pointed out that epithelioma of the cervix is the most favourable form of cancer for operation and cure. So it is with papilloma of the cavity and fundus of the uterus, with reference to total extirpation of that organ. The deeper tissues of these parts are not involved so early as in scirrhus and medullary carcinoma. Hitherto, in this country, "the unanimous voice of the profession has pronounced it to be overbold, and has rejected it from among the legitimate operations of surgery" (West). When fixation of the organ exists, and when the ilio-inguinal lymphatics are involved, operative interference would only bring surgery into discredit, and should therefore be declined. Under favourable conditions, locally and constitutionally, I submit that the question of extirpation has again been fairly forced before the profession for its reconsideration by the labours of Breisky, Freund, Schroeder, and others. Ovariotomy had a long and uphill struggle before it was finally accepted as one of the most brilliant operations in surgery. The operation of extirpation of the uterus for uterine fibroids we are now in the midst of seeing established in legitimate surgery; and I hope there is the prospect that extirpation of that organ for cancer will also soon take its place upon an equal footing with operation for that disease in other parts of the body. The one will live or die with the other, and both are still *sub judice*.

There are two methods of operating for total extirpation, the one vaginal only, and the other, the combined vaginal and abdominal. The first is simply a continuation of the operation I have already described for excision of the cervix. Hemorrhage can be controlled by clamping the broad ligaments from twenty-four to forty-eight hours, and the vaginal flaps are brought together as usual, sufficient drainage-space being left. The combined operation is the performance of abdominal section in addition to the vaginal operation for excision of the cervix. The fundus uteri is fixed, and the cervix is clamped by forceps specially arranged for the purpose. (Instrument shown, devised by Dr. Wallace.) The broad ligaments are now clamped from above, in addition to the clamping by the vagina. The uterus is then severed from them by scissors or knife, and the vessels picked up in detail and ligatured. After all hemorrhage has ceased, the abdominal clamps are removed, and the peritoneal cut edges are brought together. The vaginal part of the operation is next completed, care being taken to permit free drainage. All abdominal sections are performed in the Thornton wards antiseptically, but the spray is not arranged to play upon the abdominal cavity. An iodoform pessary placed in the vagina, eucalyptic ointment applied to the vulva, and iodoform cotton, complete the external dressings, by means of which the vagina is rendered and kept aseptic.

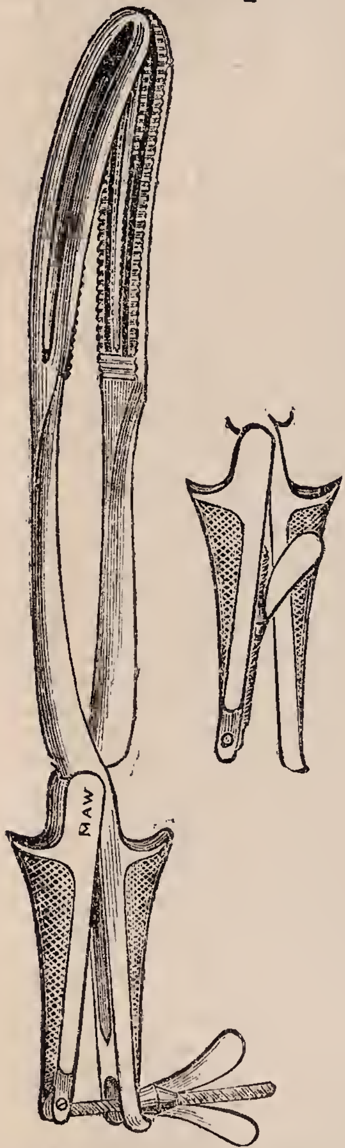
This operation is much simpler than Freund's, and less likely to be followed by hemorrhage from slipping of the three ligatures with which he ties the broad ligaments.—*British Medical Journal, Sep.* 15, 1883, *p.* 519.

60.—ON CEPHALOTRIPSY, AND A NEW CEPHALOTRIBE.

By C. Egerton Jennings, L.R.C.P.Lond., formerly Resident Accoucheur and House-Physician, London Hospital.

Why is it that out of the large number of obstetricians who perform craniotomy, and who are possessed of perforators, crochets, hooks, and even craniotomy forceps, comparatively few practitioners ever use a cephalotribe? Is not this a common case? A medical man, on being summoned to a woman in labour, finds the fœtal head above the brim of a pelvis, contracted apparently in a minor degree. The forceps are applied, but the head maintains its position. A second opinion is called in, chloroform administered, and a further but unsuccessful attempt is made to deliver with the forceps. Perhaps version is now tried or craniotomy performed; the cranium is decerebrated, and traction made by means of craniotomy forceps and crotchet. The case seeming to be desperate, further advice is obtained; a third doctor, who possibly lives some distance off, arrives after much delay; the Cæsarian operation is discussed; a final trial is, however, made to deliver *per vias naturales*, which is at last successful, the entire procedure having occupied many hours. Has not this patient been exposed to the perils of uterine inertia and post-partum hemorrhage, and by the contusion and laceration of the soft parts, which have probably occurred, has she not been rendered obnoxious to pyæmia?

I contend that delivery would have been much expedited, and the patient's safety far better consulted, had a cephalotribe been at hand. It is, perhaps, impossible to devise an instrument which, besides being efficient as a crusher, is also a good tractor, capable of ready application, and not liable to slip off when once carefully applied to the head—an instrument that will occupy little room in the contracted pelvis, that is sufficiently light not to weary the operator's hands, being at the same time well-balanced enough for him to manipulate the screw with ease, and withal fairly portable. The annexed engraving illustrates an instrument I have designed, and which, so far as my observations with it enable me to state, fulfils most of these conditions. Its extreme length is 16½ in., the length from lock to tip 11 in., the greatest width between the closed blades 1$\frac{1}{2}$in. (if very tightly screwed down another $\frac{1}{4}$-in. can be gained in this diameter). Each blade measures 1$\frac{1}{8}$ in. across at its widest part, and is fenestrated, the fenestra being $\frac{1}{4}$ in. wide and 5 in. long. A glance at the drawing will show that the fenestrated portion of the blade is deeply grooved longitudinally and dentated transversely on its inner surface, the tip meeting its fellow at an angle of 30°. There being no abrupt incurvation at this extremity, the instrument can be applied to the fœtal head with much facility. The pelvic curve is slight, and occupies the fenestrated part only. When laid on the table the tips of the blades are elevated 2$\frac{1}{8}$ in. above the level surface, whence the amount of pelvic curvature can be inferred. The handles have projecting shoulders, after the pattern of Palfrey's craniotomy forceps. The compressing screw works on a pivot in such a manner that when not in use it can be folded within the handle, fluted for its reception. It is impossible to attach too much importance to the practical value of a screw adapted in this manner. It is most embarrassing to an operator (especially if unassisted), should he wish to readjust the cephalotribe, to be compelled to detach and afterwards reapply the "third piece" in the shape of a screw, which belongs to most of the cephalotribes now in use, and which, when slippery, do most readily drop from the accoucheur's hand to the floor, to his no small annoyance. (The instrument is made by Messrs. Maw, Son, and Thompson.)

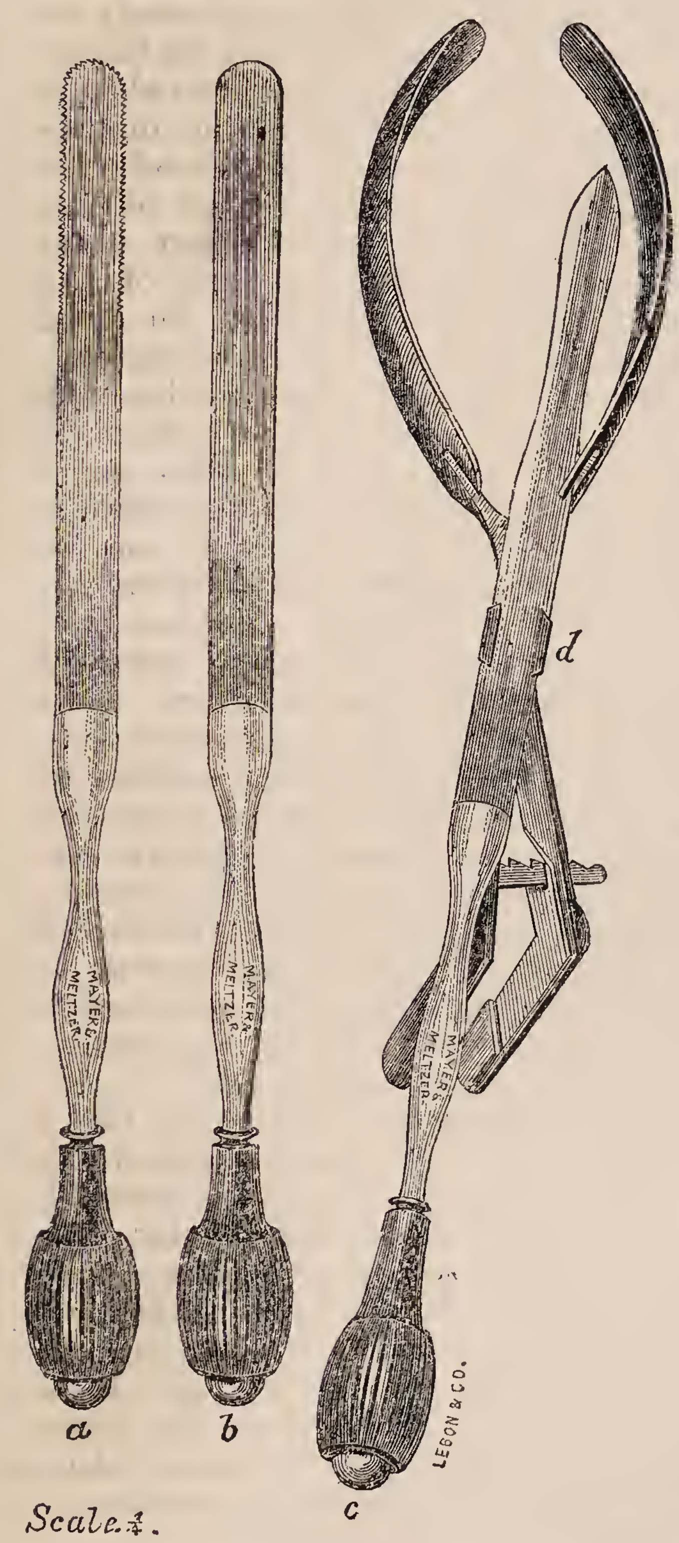


Though entertaining myself a due regard for fœtal life, I have no hesitation in expressing my conviction that craniotomy and cephalotripsy are operations far too frequently avoided. The physician who condemns sacrificial midwifery only too often applies forceps or performs podalic version as a forlorn hope: he may indeed after protracted efforts extract the offspring (frequently diseased, malformed, or mortally harmed by delivery), inflicting irremediable injury on the mother. I am convinced it would be good were he to remember the Latin motto, which applies so well to obstetrics, as to the other departments of medicine and surgery: *Destruendo conservabis.*—*Lancet, Aug.* 11, 1883, *p.* 231.

61.—ON A NEW POLYPOTOME AND FORCEPS-SAW.

By H. Macnaughton Jones, M.D., F.R.C.S.I. and Ed.,
Examiner in Obstetrics, Royal University of Ireland.

Lately I exhibited a large polypus at the Obstetric Section of the Academy of Medicine in Ireland, removed from the uterus, and in which considerable difficulty was experienced in its removal from the vagina in a nulliparous female. I then referred to the want of some instrument (which would combine the purpose of forceps and cutting knife) for the safe removal of these large growths without the necessity of incising the perineum, or the risk of lacerating it. I have not used the polypotome of Dr. Aveling. The application of the écraseur to divide the tumour into segments is tedious, and at times difficult. I have, with the aid of Messrs. Mayer and Meltzer, devised the instrument shown in the drawing. This is drawn to a scale of one-fourth. The entire weight is 14½ ounces. It consists of a straight forceps, lightly made with slender blades, yet sufficiently strong to compress the tumour; there is a groove cut in the lower fourth of these blades, and they are so shaped inside, that the edge of the movable knife or saw glides easily along the blade.



They lock readily on a revolving pivot (*d*), and the same lock carries a short sheath, through which the knife passes. The handle of the forceps is at right angles to the shank, and each half is connected by a rack and pinion bar. Three cutting blades accompany the forceps, one (*c*) shaped somewhat like a dagger, so as to readily pierce any tumour, and cut from the centre outwards; a second (*b*) broad and flat, with a rounded edge; and third (*a*) a saw. These are made of the finest tempered steel. The tumour can thus be grasped and cut through the centre, the blades either turned round in the vagina, the knife being withdrawn, or the forceps may be applied in a different direction, and the mass cut in four or more pieces. These segments may be separately withdrawn. I have not seen Dr. Van Huevel's forceps saw, but I conceive that this instrument of mine may be made to answer useful purpose in certain cases in section of the skull in embryotomy. The blades protect the parts completely.—*British Med. Journal, June* 9, 1883, *p.* 1129.

62.—ON THE VAGINAL EXTIRPATION OF CARCINOMA OF THE UTERUS.

By Carl L. E. Schroeder, M.D., Professor of Midwifery in the University of Berlin.

The operative removal of cancer of the uterus is always indicated when it is thought possible to remove all the tissue involved by the neoplasm. If this seem possible, or even probable, the only reason for abstaining from the operation ought to be severe constitutional diseases threatening life in a measurable space of time, such as tuberculosis or Bright's disease.

The question whether it is possible to operate radically may sometimes be very difficult indeed to answer, and it would be an illusion to suppose it possible to decide it with the utmost certainty. It is possible, however, to distinguish under not too unfavourable circumstances, with perfect certainty, very small infiltrations, such as occur principally along the lymphatic vessels. For this purpose it is absolutely necessary to narcotise the patient, and to examine her in the dorsal position by the bimanual method. By pulling down the uterus with a volsella, and introducing two fingers into the rectum, the different organs of the pelvis and the pelvic cellular tissue are thoroughly investigated by letting the tissue pass, piece by piece, between the examining fingers. If the uterus be found to have lost its normal mobility, this must give rise to suspicion, although it may be the result of adhesive perimetritis. Hard infiltrations along the sides of the uterus, diminishing in thickness towards the broad ligaments, or small round nodules in the recto-uterine ligaments, are very characteristic of malignant infiltration.

Finally, unusual inflation of the cervix shows that the neighbouring cellular tissue has already participated in the carcinomatous process. On the other hand, it is easy to decide by digital examination, as well as with the speculum, how far the neoplasm has extended on to the vagina.

A very important question is, how far up along the mucous membrane of the cervix, and of the corpus uteri, the carcinoma reaches. I believe that we can derive valuable information upon this point from the study of the form in which the neoplasm presents itself. For instance, in the most frequent form, cancroid of the vaginal portion (cauliflower-excrescence) we see these mucous membranes either not at all involved, or only involved at a very late stage of the disease. This is very characteristic, for we often find the cancroid extending far up into the wall of the cervix, excavating the tissue by ulceration, while a piece of the mucous membrane of the cervix, in a state of catarrhal inflammation, but not malignantly involved, hangs over the ulcerated cavity. On the contrary, the cancroid attacks first the mucous membrane of the vagina, next the pelvic cellular tissue, after that the tissue of the cervix, and finally the mucous membrane of the latter.

The second form in which carcinoma occurs, is the primary carcinoma of the cervical mucous membrane (encephaloid). It progresses just in the contrary order. Ulcerating first the wall of the cervix, and then that of the uterus, it extends relatively late beyond the external os, on to the mucous membrane of the vagina, and on to the pelvic cellular tissue.

Between these two forms we must place primary cancer of the wall of the cervix (scirrhus). It involves, at an early period, the body of the uterus and the cellular tissue of the pelvis. Besides this, it often perforates through the top of the vaginal portion into the vagina, or towards the cervical canal, attacking the mucous membrane of the cervix very late. Cancroid of the vaginal portion thus leaves the uterine mucous membrane intact, while the cancer of the cervix spares, for a length of time, the pelvic cellular tissue. Besides these forms, the cancer is found primary on the mucous membrane of the body of the uterus, extending thence on to the cervix.

We now come to speak of the removal of the diseased parts. It is always possible to remove the uterus, even if the whole of this organ be diseased. The adjacent parts of the vagina can also be removed if they be involved. I have even performed total extirpation of the vagina successfully on account of superficial primary cancer of the vagina, although a recurrence followed later. Thus the possibility of removing even extensive parts of the vagina must be admitted. It is, however, another question whether it is advisable to undertake extirpation under such circumstances; for, where extensive parts of the vagina are attacked, the deeper tissue will always be found diseased, and the operation will, most probably, not be radical. Admitting that it is possible to remove small nodules situated above the cervix, or behind the vaginal fornix, there will generally be more germs lying deeper; and to follow these up like the extirpation of the axillary glands after the amputation of the mamma, would be a matter of impossibility. Even when the infiltrated cellular tissue seems to be limited to the parts close to the cervix, an operation in healthy tissue will not be possible; for in pulling down the ulcerated cervix with the volsella, it will tear, and render the operation impracticable.

It is often possible, however, to remove cancroid of the vaginal portion radically, and, under favourable circumstances, also cancer of the wall of the cervix, if they be discovered at an early period. If they be found not to extend higher up than to the internal os, or a little further (for it is possible to perform partial excision above this point), supravaginal amputation can be performed. Cancer of the cervical mucous membrane, and of the body of the uterus, always necessitates total excision of the uterus.

The supravaginal amputation is performed in the following manner. A Museux's volsella is attached to each lip, and the uterus drawn firmly downwards. In some cases, it is then advisable to divide the cervix on both sides up to the vaginal fornix. The knife is now carried around the vaginal mucous membrane, dividing it all around in healthy tissue, and about one centimètre distance from the diseased parts. After this, I push the anterior vaginal fornix, and with it the bladder and its peritoneal duplicature, upwards above the level of the internal os. Then, always dragging the uterus firmly downwards, I cut off the anterior lip transversely, taking care to make the incision in healthy tissue. The hemorrhage is then arrested by suture, deep stitches being taken to unite the vaginal with the cervical mucous membrane, and these being pulled over the stump. The same proceeding is repeated with the posterior lip, during which manipulation the peritoneum of Douglas's pouch is generally torn. Finally, the bilateral incisions are closed, deep sutures uniting the fornix with the sides of the uterus.

Should it be necessary to perform total extirpation of the uterus, this is executed in the following manner. Two volsellæ are again applied to the lips; these pull the uterus as far down as possible. A circular incision is then made in healthy tissue around the cervix, and the vaginal mucous membrane pushed back and upwards, as in the previous operation. Next Douglas's pouch is opened by a transverse incision, and the uterus is then turned over, so that its fundus appears in this opening. This is not always an easy manipulation. I generally first produce a retroflection of the uterus, then catch the fundus with a volsella, and pull the body of the uterus through the incision in Douglas's pouch. After this has been done, it is easy to separate the peritoneum of the vesico-uterine pouch, leaving the uterus now only attached to the broad ligaments. These are ligatured either with a single ligature, or separately in different portions. Finally, the uterus is cut off close to its side, leaving a broad piece of tissue between the ligatures and this incision, in order to prevent the ligature from slipping off, a most disagreeable event, which otherwise is likely to occur. After having performed this on one side, it is repeated on the other side in the same manner, this being generally much easier. The wound in the peritoneum is now closed. In stitching it, I generally attach the ligatured broad ligaments to the corners of the wound. They thus form two pedicles, turning their stumps outside, enabling me to stop any hemorrhage that might occur later on. Between both stumps, I leave a small opening for a T-shaped drainage tube, the end of which, protruding out of the introitus, is wrapped up in salicylated cotton. This cotton is removed as often as it is soaked; otherwise the patient is left quite to herself. The sutures are removed after a fortnight.

The technical execution of this operation is certainly not to be called easy. In order to perform it with skill, the operator must be accustomed to cervical operations, and to the manner of using the knife and ligatures in the depth of the vagina. Above all, it is necessary to take all the possible advantage of the mobility of the uterus, drawing it far down towards the introitus.

The principal danger of the operation consists in the ligatures slipping off the broad ligaments. It is then very difficult to stop the hemorrhage from the uterine or the spermatic arteries, for the stump generally retracts in such cases, and the blood flows upwards into the abdominal cavity.

The operation is very difficult when the vagina is narrow. Thus it is not easy to perform on nulliparæ, and is often impossible on very old women. Besides it will scarcely be found possible to perform it when the uterus is very much enlarged; for instance, when it has reached the size of the pregnant uterus in the third month. In such cases, it may be necessary to perform Freund's operation—the total removal of the uterus by laparotomy; but this latter operation, as experience has shown, is much more dangerous than the excision through the vagina.

As to the success obtained by the vaginal extirpation, I must admit that it is not yet to be called satisfactory, especially as far as the question of recurrence is concerned. I have lost 7 out of 23 patients operated upon. This I consider a very bad result, for the operation, although a difficult and a dangerous one, ought to make us expect better results. We certainly may hope that it will follow the lead of the other large gynæcological operations, showing a better prognosis as fast as the technical methods become more perfect.

The supravaginal excision is much less dangerous. I have operated on 64 patients with 8 cases of deaths. Unfortunately, in a great number of my patients I have seen recurrence, in some cases after two or three years. Other cases have withdrawn from my observation, and only very few have remained until to-day quite without recurrence. This might also be a reason for discouraging us. We have, however, the consolation that the operation is performed according to correct principles, and that the prognosis will no doubt improve by-and-by, especially if the operation be performed early and radically. Besides, even if a recurrence take place, the patient suffers little towards the end of her life, compared with the dreadful sufferings produced by ulcerating cancer, for the disease generally does not recur on the cicatrix in the vaginal fornix. It spreads upwards on to the pelvic cellular tissue, and saves the patient from the dreadful symptoms of cancer, from hemorrhage and ulceration. Let it thus be our object to endeavour to improve the prognosis of the operation, and let us bear in mind that the fate of these patients is such that, if only one out of twenty be radically cured, this ought to be considered as a good result, and as a consolation for many cases treated unsuccessfully.—*British Medical Journal, Sept.* 15, 1883, *p.* 520.

63.—ON THE VAGINAL EXTIRPATION OF CARCINOMA.

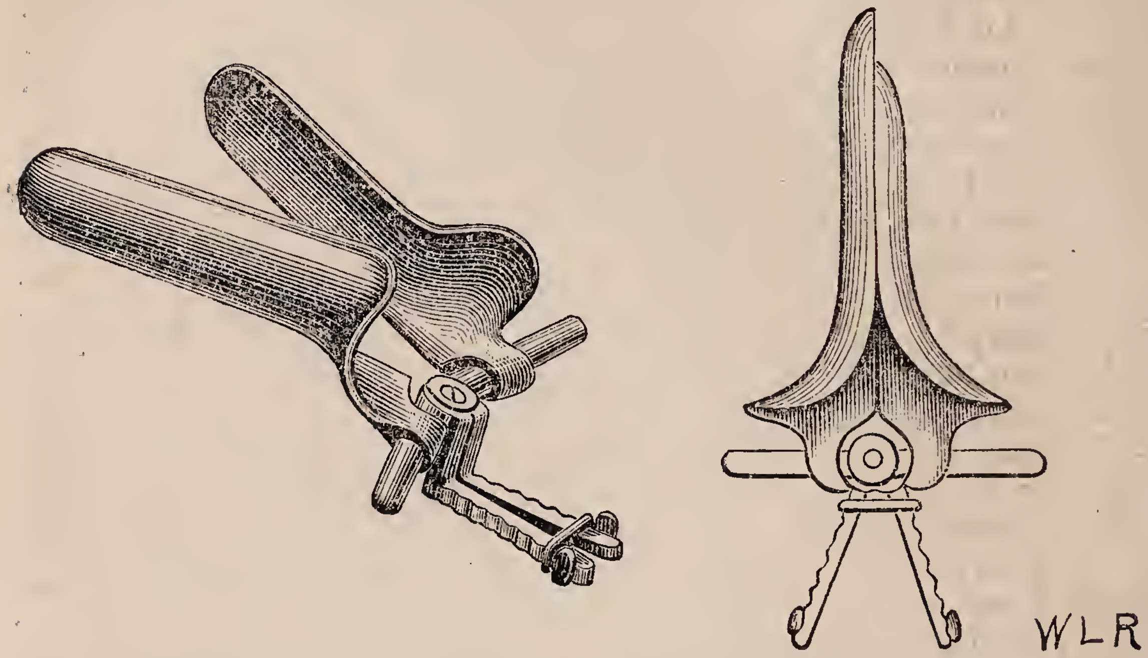
A letter from Prof. OLSHAUSEN was received by Sir Spencer Wells recording modifications in the published description of his operations up to 1881. These consisted of not ligaturing the broad ligaments until late in the operation and then using elastic ligatures, which prevented hemorrhage. The elastic ligature was applied by means of a bent aneurysm-needle round the broad ligaments. It was essential to leave a considerable amount of cellular-tissue to form a long stump, to prevent retraction and slipping off of the ligatures. The operation was performed under an irrigation of a two per cent. solution of carbolic acid. After the operation, Douglas's pouch was washed out with a four per cent. solution of boracic acid. A large drainage-tube was introduced, the peritoneum being now stitched together. The vagina was packed with loose iodoform gauze. This gauze was generally removed between the fourth and eighth days, and the drainage-tube about the same time. The elastic ligatures, however, remained two or three weeks. This operation he deprecated when the uterus could not be drawn down as low as the vulva. He had performed, or attempted to perform, the operation twenty-eight times during the last two and a half years. In three cases he had to be satisfied with the supravaginal operation; the patients recovered, but one had vesico-vaginal fistula. In the twenty-five remaining cases, the operation was completed; seven of the patients died: two on the day of operation; three of septicæmia on the second and third days; one of carbolic poisoning on the second day; and one of iodoform poisoning on the sixth day. Besides these, one died suddenly of embolism of the pulmonary artery on the twenty-sixth day. (A similar case had also recently occurred in his practice within the last few days, where he had performed myotomy.) Of the seventeen remaining cases: in two, no return took place for one year: in two, two years had elapsed without a return; in four or five, a recurrence had taken place. He then proceeded to criticise the operation, and to express a guarded opinion as to its desirability. In one case, he had removed the uterus in a pregnant woman; she lived only eighteen months. He called special attention to the danger of injury to the ureters, which appeared to have escaped in the mode adopted by the Germans, in pushing up and stripping with the finger the loose cellular tissue which surrounded the supravaginal portion of the cervix. Such success had not attended other operators. He strongly deprecated any one attempting the extirpation of the uterus, without previously performing the operation on the dead body.—*British Medical Journal, Sept.* 15, 1883, *p.* 521.

64.—ON A NEW BIVALVE SPECULUM.

By W. L. Reid, M.D., Physician to the Dispensary for Women, Western Infirmary, Glasgow.

The following may be considered to be the chief desiderata in a good speculum:—1. That it shall show well the cervix and upper part of the vagina. 2. That it shall not greatly distort the parts. 3. That it shall be so adaptable to individual vaginæ as not to give pain. 4. That it shall be self-retaining, and thus leave both the operator's hands free. 5. That it shall give free access to the cervix for operative interference. 6. That it be simple and easily kept clean. 7. That it be easily carried and not easily broken. It may be argued that it is physically impossible to combine all these advantages in one instrument, and this is probably true, but the more nearly we can do so the better.

The idea with which I started may be thus expressed:—Two parallel blades starting from the centre of a curved bar on which they slipped easily, would diverge at their points, so as to strain open the upper and larger part of the vagina, and thus show the cervix while not unduly dilating the vulvar orifice. The blades retained their position because the elasticity of the vaginal walls caused them to lock on the bar. So far as I know, this method of fixing the blade is original. This instrument was used for a little while, but it was found to be a serious disadvantage that the opening of the upper and lower parts of the vagina could not be made independently. This led to various modifications, and eventually to that I am about to describe. The instrument (figured in the accompanying woodcuts) consists of two blades an inch and a quarter broad, the anterior three and a half, and posterior four inches long. These are flattened at the points, but otherwise like those of Cusco's bivalve. The bar on which they slide is hinged in the middle, so as to permit the uterine ends of the blades to be separated from each other to the extent of four inches. From the jointed ends of the bar, or rather bars, for the hinge divides it into an anterior and posterior part, two legs proceed which are notched on their external surfaces, and have two flat finger pieces at the ends. When these ends are pressed together, the bars form an obtuse angle at the hinge. and thus the blades are caused to diverge at their points. When it is desired to retain the blades at a given degree of divergence, a catch, which consists of an oblong piece of metal surrounding the legs, is made to slip down along them, and fix itself in the notches on either side. The anterior and posterior bars are each an inch and a half long, and the blades may be slipped out to the extremities, so as to widen the vulvar orifice to the extent of two and a half inches. The notched legs are on a plane half an inch below the level of the



hinge, so as not to hinder manipulation through the speculum. The whole is made of metal, nickel plated, and its construction will be more readily understood from looking at the woodcuts than from any further description in words.

This speculum is used in the following manner :—The patient lying, either in the dorsal or left lateral position, the points of the blades are introduced with their edges antero-posteriorly; but when once fairly within the vulva, they are turned so that their flat surfaces come to occupy this position. The points are then pushed well up into the posterior fornix before they are separated, and when this is done, the short anterior blade slips over the cervix and takes its place anterior to it. Before this is done, however, it is better to slip the blades, usually only the posterior one, along the bars, so as to take advantage of the vulvar orifice of the vagina as far as is consistent with the avoidance of pain. Having expanded the blades as far as necessary by means of the notched legs, they are fixed in this position, and the cervix is open to sight and treatment. In withdrawing the instrument, all that is necessary is to touch the catch with the point of the finger, when the blades fall together, turn the edges antero-posteriorly, when the vulvar ends slide towards the hinge, and the whole slips out of the canal.

Let us now compare this instrument with the ideal one with which we started. 1. This does show the cervix and upper part of the vagina well, the vulvar orifice being strained as far as it can be in the individual vagina, the points of the blades are independently opened till the most is made of the space in the upper reach of the canal, and, the blades being both comparatively short, the cervix drops well into view. All the vaginal walls are seen, except those parts covered before and behind by the blades; not so much, of course, being visible as with Sims' instrument, which only covers the posterior wall.

2. This speculum does not distort the parts unless the points are very fully expanded, when, by pulling on the cervical attachments of the vagina, the os is drawn open and the interior of the canal is exposed to view. When opened only so far as to allow the cervix to pass between the blades, a natural view is obtained.

3. Only one speculum is needed for all kinds of vaginæ. In the case of a nullipara the blades are slipped either a little way along the bars or not at all, the points only being opened, while in a multipara, where the external orifice is large, the blades are carried to near the extremities of the bars before the points are caused to diverge, and thus the whole canal, both above and below, is put on the stretch. The saving of pain in the case of a woman with a narrow tender vagina is very great, and yet the utmost is made of what space there is.

4. As the blades are always more widely open above than

below, this instrument is perfectly self-retaining, and leaves the operator's hands perfectly at his disposal.

5. There is very free access to the cervix. By taking advantage of the arrangement for dilating to its utmost the entrance to the vagina, I have been in the habit of using, not only the sound, Playfair's probe, the uterine lancet, etc., but also Ellinger's dilator, and I have found it a considerable advantage to be able to watch its effect on the os externum. By its help one can hook up the cervix with a tenaculum and introduce a tent with extreme ease. As the points of the blades are flat and the one shorter than the other, it is very convenient for placing a tampon in the vagina, and with it the whole canal can be firmly packed from within outwards.

6. My original idea was to have neither screws nor joints to harbour dirt or be difficult to keep clean. The only specula I know of which open independently at the upper and lower parts of the vagina are Arnold & Son's improvement on that of Mazarem, of Lisbon (Cat. Obst. Insts., Lond. Obst. Society, 1879, p. 350), Goodell's "base expanding" (Lessons in Gynecology, 1880, p. 27), and Mundé's modification of Sims' and Nott's speculum (Minor Surgical Gynecology, 1881, p. 84), and I submit that these are less simple than the one under consideration, they all having both joints and screws. In order to thoroughly clean it, the blades are simply slipped off the bars, this is done in a second or two, and each part washed every time it is used.

7. Being of metal, it is not liable to be broken, and as I carry it with the blades unshipped and laid alongside the bars in a pocket of chamois leather, the whole measures 5 × 3½ × 1 inches, and thus takes up little room in an ordinary pocket.

This instrument has certain disadvantages. Being of metal, it is a good conductor of heat and so requires warming in cold weather. It could not be used with the actual cautery for the same reason, and strong mineral acids would destroy its reflecting surface. To obviate these disadvantages, I am getting a pair of blades covered with vulcanite. In bleeding the cervix, one has to mop up the blood with absorbent wool, as it cannot be run into a vessel as with a tubular speculum.

Experience in its use has shown that, with it, work can be carried on with great rapidity. There is no choosing of a speculum, the one suits all cases; the closed blades are easily passed into position, opened, fixed, and withdrawn, so that no time is lost. The opening of the blades can be managed so as to stop whenever discomfort begins to be experienced, as each notch on the legs corresponds to only an eighth of an inch of expansion at the points of the blades.

The instrument is made and sold by W. B. Hilliard & Sons, 65, Renfield Street, Glasgow.—*Glasgow Med. Journal, Sept., p.* 224.

ADDENDA.

65.—ON INFARCTIONS AND EMBOLISM OF VARIOUS ORGANS.

By D. J. Hamilton, M.B., F.R.C.S., F.R.S.E., Professor of Pathological Anatomy, Aberdeen.

For several years past I have directed special attention to the study of instances of infarction in various organs, and occurring under different condition. Certain circumstances which I had observed led me to suspect that the current doctrines taught in regard to thrombosis, embolism, and infarction were open to question, and it was in testing the accuracy of the accepted notions on these subjects that the matter included in this paper was elicited.

It is with a view of looking at the relationship between them, in perhaps what may seem to many a new light, that I venture to bring the following before the notice of those who are interested in the subject.

The term "infarction" or "infarctus," is a derivative of the verb *infarcire*, to stuff or cram into, and Laennec (Traité de l'auscultation) in all probability employed it with the idea that the part which is the seat of the infarction is infiltrated with blood. In some cases, such as in the infarctions of the lung, this is certainly true,—the part is stuffed or infiltrated with blood; but in others, notably in the spleen and kidney, I shall have to show, among other things, that the idea of the wedge-shaped block being primarily the seat of a universal effusion of blood is erroneous. Any such conclusions, however, will be better understood if I lay before the reader, to begin with, a somewhat detailed account of the bodies known as infarctions, as they occur in individual organs.

Infarction of the Kidney.—The best example of this is found in connection with vegetations attached to the aortic valve, and has most commonly the following characters:—There is noticed a slight depression of the surface in a circumscribed area. The area has a sinuous border. It is paler in colour than surrounding parts, and hence becomes prominently marked out from them. When cut into, the infarction usually has a wedge or pyramidal shape, the narrow end pointing towards the hilus. Its general colour is *pale cream yellow*, sometimes inclining at the border to a slightly orange hue. Around it there is, in certain instances, a margin or zone of a red colour, but in the case of the kidney this is often almost absent. It is usually most evident towards the pointed extremity of the wedge. The infarction feels hard, somewhat tough, and not a drop of blood can be squeezed out of it. According to my experience, the cut edge is generally slightly below the surface of the surrounding parts. I have seen cases where it was slightly higher.

The body which I have described will be admitted by all to be what is usually found in cases where there is an evident source of embolism. Is there a hemorrhagic stage previous to this ? I have never seen it in true embolic infarction, nor do I believe that where the part is free from any inflammatory action there is any red stage such as one invariably sees in the hemorrhagic infarction of the lung.

The infarction of the kidney when examined microscopically, is simply more granular than the other parts. It shows, in fact, the commencement of a caseous necrosis. In course of time this becomes more evident, and, finally, the whole dead mass is absorbed, without there being necessarily any softening, and without any evidence of putrefaction.

As regards the cause of the renal infarction, there cannot be the slightest doubt that it is brought about by obstruction of a branch of the renal artery, this usually being embolic. If the arterial branch going to the infarction be dissected upwards, the obstruction, if large, can be found. It is usually, if it has lain in contact with the wall of the vessel for any time, adherent to it, so as completely to obstruct the channel. But such an obstruction would not give rise to a necrosis were the circulation within the kidney not a terminal one. If a single large branch of the renal artery be injected artificially with some coloured mass, the part supplied by it is found to be as sharply demarcated from the others as the border of an infarction is. More especially is this evident when there are two renal arteries entering the organ. If one of these be injected, the exact representation of the shape and border of an infarction results; not a particle of injection gets into the area supplied by other branches. The result is most satisfactory when there are two renal arteries, seeing that where there is only one a certain amount of injection is liable to return by the veins. Thrombi sometimes obstruct the artery, and give rise to similar consequences.

Infarction of the Spleen.—So far as the naked eye appearances are concerned, the description of the infarction of the spleen, associated with occlusion of the artery, corresponds almost exactly with that in the kidney. The masses are mostly wedge-shaped ; they are usually somewhat depressed below the surface of the surrounding parts; they have a yellow colour; and there is a well-marked red zone. The red zone is particularly well seen around splenic infarctions, more so, perhaps, than in any other organ.

Infarction of the Brain.—Are the vessels of the brain terminal or not? In the year 1874 Heubner (Die leutische Erkrankung der Hirnarterien) and Duret (Archives de physiologie normale et pathologique, 1874, p. 60) published independently a series of studies upon this subject, which brought out some very important facts. Their methods of examination were practically alike. Their procedure consisted in running a coloured fluid through the main arteries or certain of their branches, carefully ligaturing those through which it was not intended to pass, and subsequently examining the parts reached by the injection. They arrived at almost exactly similar conclusions.

Heubner found in the first place that there is a free communication, practically speaking, between all parts of the pia mater. The pia mater vessels are constructed of large trunks and a delicate network of finer vessels. The injection runs firstly along the large trunks, and the whole of these throughout the greater extent of a hemisphere may become filled with injection from a single branch before the vessels of the network admit it. When these large trunks become distended the vessels of the network then begin to fill. Those parts of the network in immediate connection with the vessel containing the canula become filled before other parts, but gradually the circumference of the injected area enlarges beyond the bounds of distribution of the branches of this particular artery, although distant parts never become so completely filled as those near the point of injection.

From this network of vessels in the pia, but never from the large trunks themselves, branches run into the cortical substance. This arrangement he looks upon as a salutary one, as tending to diffuse sudden exacerbations of blood pressure. The increased pressure expends itself first upon the large stems of the pia mater; it next influences the network of vessels ramifying in the membrane, and only subsequently to this does it come to bear upon the vessels of the cortex. He regards the network in what seems to me a very proper light, namely, that of a reservoir, as a means of diffusing suddenly increased arterial pressure.

While, however, there is this free anastomosis between the vessels of the outside of the brain, those which go directly to the internal parts, the basal ganglia more particularly, are devoid of any such confluence. They are terminal arteries in every sense of the word. They are chiefly given off from the anterior, middle, and posterior cerebral trunks shortly after their origin, and perforating the base of the brain, find their way upwards to the basal ganglia and neighbouring internal parts. Here not only definite ganglia, but definite areas in each ganglion, are nourished by special sets of these perforating branches. The number of vessels which goes to the basal ganglia is relatively much less than that which supplies the cortex. The point which I wish to draw the reader's attention to at present is the difference subsisting between the vessels of internal parts of the brain and those of the cortex; for, while the former may practically be held to be terminal, the latter communicate freely, more especially by their large branches.

When the main trunk of a cerebral artery, or one of its chief branches, therefore becomes occluded, say from embolism, the effects will vary according to the amount and site of the occlusion. If the occlusion is, let us suppose, at the commencement of the middle cerebral artery, and if the perforating branches running up to the basal ganglia from it be rendered useless for circulating purposes, the effect may be that the parts supplied by the deep branches (portions of caudate and lenticular nuclei, the anterior limb of the inner capsule, &c.) may necrose, while there may be no or only a very slight cortical lesion if the anastomosis in the pia with other trunks has been sufficient to keep up the nourishment of the part of the cortex whose proper blood supply has been removed. I have seen, for instance, where an embolon was impacted in the commencement of the middle cerebral artery, in three months afterwards, a marked sinking or depression of the cortex in the motor area, specially in the third frontal convulsion and operculum, but no destruction of the grey matter, while the anterior portions of the basal ganglia and anterior limb of the inner capsule were almost completely absorbed. The anastomosis in this case in the pia had been sufficient to retain the integrity of the cortex, while the deeper parts supplied by the middle cerebral, being penetrated by branches which are terminal, had suffered necrosis. This, of course, is not always the case. It may happen, and generally does happen, that the anastomosis of the pia vessels is insufficient to retain the vitality of the occluded area, and as a consequence destruction of the cortex may follow.

We must, therefore, be guarded in making the statement that the vessels of the brain are terminal. Certain of them are so, but others are not. The effects of occlusion will vary according to the site. As a matter of fact, the usual result of embolism occluding a main stem is fatty degeneration, more or less complete, of the area supplied. The part assumes a yellow colour, and is filled with compound granular corpuscles. It is absorbed in course of time, and the pia mater becomes depressed at the vacant spot. In the fact of its becoming filled with fatty corpuscles, I recognise a process different from that which follows upon embolic occlusion of the kidney or spleen. I have never seen compound granular corpuscles in infarctions in them where the vessel is rendered completely impervious. The process of destruction in them is one of necrosis with caseation. The difference I look upon as due to the fact that the vessels of the kidney and spleen are much more thoroughly terminal than those of the brain. When one is occluded the part dies almost at once. In the cerebral cortex, however, it is different. Here a certain time may elapse before the death of the part is complete. The tissue is under-nourished, but not completely deprived of its supply, and consequently becomes fatty. Under-nourished parts throughout the body, as a rule, undergo fatty degeneration. If the renal artery is partially ligatured, the organ becomes fatty; if completely so, it suffers sudden necrosis and caseates. Tadpoles and fungi, if under-nourished, also suffer from fatty degeneration (Cunningham, On Certain Effects of Starvation on Vegetable and Animal Tissues, 1879).

When the part of the brain supplied by an embolic artery is examined within a few days after the occurrence of the stoppage, there are usually some punctiform hemorrhages within and around it. These at other times are absent. There is not a diffuse effusion with tearing up of the tissues, but within the dying or dead part, particularly towards its margin, these punctiform extravasions are sometimes abundant. They may also be seen in the pia mater covering the part. How are these to be accounted for? A little reflection on what I have said regarding the incompletely terminal character of the vessels of the brain will show how there should be this characteristic difference. When a set of vessels of the cortex is occluded by an embolon, the surrounding stems pour a certain amount of blood into them, just as Litten has shown to be the case in the kidney, only to a greater extent. The part becomes weakened through malnutrition. Its vessels suffer accordingly. Arterial blood from surrounding sources is pumped into the capillaries, but may not be sufficient to carry on the circulation. Congestion and rupture, with punctiform hemorrhages, result. I cannot see that there is anything extraordinary in this; in fact, it is what one *a priori* would anticipate. If there were no anastomosis I should not expect to find hemorrhage, but seeing that there is a certain amount of this, although not sufficient to retain the part in its original state, hemorrhage of a punctiform character is only to be looked for as a natural consequence. In some cases, however, even this punctiform hemorrhage is absent, and when this happens, I should say that the supply of blood from neighbouring sources has been small or wanting. The infarction of the brain in such approaches nearer to that of the kidney and spleen.

Hemorrhagic Infarction of the Lung. — MM. Cornil and Ranvier, in their work on Pathological Histology (English translation by A. M. Hart) make the following remarks in regard to infarctions generally :—" By using the word infarctus to signify certain lesions following embolism, Virchow has greatly obscured the subject. Before Virchow, the name was applied to a series of ill-defined changes, particularly to hemorrhages into parenchymatous tissues, called by Laennec foci of pulmonary apoplexy, hæmoptoic infarcts. Since then the doctrine of embolism has become generalised, and there has been a certain tendency in science to refer to embolism all what the older authors called infarctus." There is no doubt that there is a great deal of truth in these remarks, at least as regards the hemorrhagic infarction of the lung.

The hemorrhagic infarct of this organ is found most commonly in cases of cardiac valvular obstruction, in aortic as well as mitral disease, although more frequently in the latter. It is usually associated with infarctions of the kidney and spleen, or it may be with cicatrices in these organs, resulting from former infarctions. They are commonly multiple, and those which have a typical wedge shape are placed in the lung tissue immediately under the pleura. They vary in size, some being minute, almost punctiform, hemorrhagic areas, while others may have a base of an inch and a half to two inches. The mass projects above the surrounding lung surface so much as to be a prominent object even before the part is incised. It has a leaden or purple colour. On cutting into it the wedge shape is certainly a very marked feature, the colour almost black from the deep venous tint of the blood contained in the affected area, and the border is so sharply defined as to be distinctly recognisable to the touch. Sometimes hemorrhagic masses of a similar kind are found along with these at the centre of the organ, but these never have a wedge shape ; they are more or less round ; it is only those at the surface in which the characteristic shape is noticeable. The lung tissue generally is much congested ; it may be œdematous or it may not.

Microscopically examined the mass is made up of air vesicles filled with blood. The blood lies in the cavities of the air-vesicles. There is only here and there a corpuscle to be seen in the interstitial tissue. Cohnheim makes the statement that the effused blood does not contain fibrin. This is certainly a misstatement ; an abundant fibrinous network may be seen in such cases, and the small bronchi and infundibula are commonly plugged with it. The infiltration of the alveolar walls with blood-corpuscles, which he states occurs, I have never seen. In all the cases I have examined they have seemed to be compressed by the blood effused into the cavities. There is no evidence of necrosis of the walls; the appearance is very like, with the exception that there is less fibrin, an early stage of red hepatization, that is to say, where there have been local hemorrhages. The air-vesicles, however, are more densely packed than in hemorrhage from croupous pneumonia. Large hemoglobin crystals usually separate very soon, and can be seen lying throughout the section.

Although these infarcts may be numerous throughout a lung, there are not usually any cicatrices from former deposits such as one sees in the kidney or spleen, it may be in the same case. Nor are different stages of necrosis visible as in those mentioned. Some of them are occasionally partially decolorised and softer than the others, but they never become caseous, yellow, and hard, with a well-marked red zone as in the spleen. Septic infarctions form wedge-shaped abscesses; these ordinary hemorrhagic infarcts do not.

The usual supposition is that such hemorrhagic wedge-shaped foci are due to pulmonary embolism. The German School of Pathologists is quite dogmatic on the subject. No one, however, so far as I know, has been able to find, as a regular occurrence, an embolon in the branch of the artery going to the infarct. I have myself sought in vain for it; while in the case of the kidney, spleen, and brain, where of any size, it is not difficult to discover. The statement, therefore, that these hemorrhagic infarcts are embolic in their cause, is purely an invention made to meet the doctrine of embolic infarction generally. Where do the embola come from? There is usually in such cases no endocardial disease on the right side of the heart. This difficulty is, however, got over by the allegation that clots form on the venous side of the circulation during life, and that portions of these are swept off from time to time, and are implanted in the pulmonary artery. This is pure fiction. Who has ever demonstrated in an ordinary case of valvular insufficiency that there is any undue tendency to clotting of the blood either in the heart or large veins? The clots one finds in the right side of the heart, where the endocardium is uninjured, have not the appearance of having existed for any length of time during life. They have been formed during the last moments of life, or immediately after death, and do not differ from clots that are found in a hundred and one other cases unassociated with pulmonary infarctions. Where the endocardium is injured a clot having *ante-mortem* characters may form on it; but all the clots found in ordinary cases of pulmonary infarction on the right side of the heart are loosely detached, and show not a sign of having formed during the life of the patient. The statement that these are the source of the embola I therefore hold as being totally worthless. I should require much further demonstration of their existence during life before beginning to found any collateral reasoning upon the effects they may produce in the lung when detached.

Such premisses for the embolic argument are consequently weak to a degree, and will not bear crucial examination. Let us see, however, what the effects of embola driven into the pulmonary artery are; let us suppose for an instant that embola do find their way in such cases into its subdivisions. Do hemorrhagic infarctions result? Virchow found (Gesammelte Abhandlungen, s. 285 and 294) that by introducing small caoutchouc embola into the jugular vein, and so into the pulmonary artery, no change resulted, and he supposed that the anastomosis of the bronchial artery was sufficient to make up for the loss in the direct blood supply. Panum (Virchow's Archiv, Bd. xxv. s. 452) made out that small simple embola introduced into the pulmonary artery merely become encapsuled, and induce no further change in the lung tissue. The embola he employed were the crystalline lenses of the flounder. Cohnheim and Litten arrived at similar results on employing small embola composed of paraffin. The portions of lung beyond the embolon were just as dilatable as other parts, and in no respect differed from them. In a few cases they met with appearances which somewhat resembled hemorrhagic infarctions, but they were not so sharply defined as in man; and a significant fact, for what I hold to be the true relationship of hemorrhagic infarction to the lung tissue, is that they were not situated in the region of the embolon, but at some distance from it, near the surface of the organ, a portion of normal lung tissue intervening. In a child, in whom the upper extremity had been amputated at the shoulder, and where the subclavian vein had been tied, I had an opportunity of seeing the effect of an embolon, capable of obstructing a small branch of the pulmonary artery, upon the surrounding tissue. The clot which had formed in the vein had become partially detached, and had been swept into a branch of the pulmonary artery supplying the lower lobe of the right lung. The child lived for three days, and after death the condition of the embolic portion of lung was that of extreme anæmia. The area cut off from its blood supply was sharply demarcated, the outline being capable of being traced with distinctness, and the part, by reason of its pallor, was prominently differentiated from the surrounding lung tissue. It seemed to be dead, but had not yet gone on to degeneration. It resembled in most respects embolic infarction of the spleen or kidney. The embolon lay firmly impacted in the vessel, but as yet not adherent to its walls. Being bland and unirritating, it had not caused any inflammatory mischief, and in no part of the infarction was there a vestige of any hemorrhage. The vessels in the pleura over the part involved were markedly congested, and here and there minute punctiform extravasations into the pleural tissue had resulted. The vessels here had evidently reacted to the diminished blood-pressure in the infarction. There had been an attempt to set up an anastomotic supply, but this had been insufficient for the demands of the part.

Where the embola are more minute than in the case recorded, where they form in fact capillary obstructions, and where they are very numerous and universally scattered through a lung, or through both, the effects are different. Examples of this form of embolism are best seen in "fat embolism" from various causes. The fat embolism resulting from simple fracture of a bone forms one of the most beautiful experiments on this subject capable of being made. The embola are unirritating; they do not carry into the part any septic mischief; and they are so minute as effectually to occlude the capillaries alone, or these along with the smallest branches of the pulmonary artery. As a fact, I have found that croupous pneumonia is one of the commonest effects of the condition of multiple embolism. In some cases the bases of both lungs may be entirely solidified, or a whole lung may be rendered non-vesicular. In others there appears to be simply an œdematous condition of the organ. The two, of course, are closely related, the former being simply the effusion of a more highly albuminous fluid than the other. The cause of both is undoubtedly the increased blood-pressure. Where the embola impacted in a lung are few in number, so as to block up only a small number of channels, it is questionable whether they cause any difference in the normal pressure in the blood within the organ. The collateral branches are so numerous, and the vessels so extensive, that the slight increase which might result is universally diffused, and causes little disturbance. Where however, the embola are so numerous as to be found in every second or third capillary, the circumstances are different, and, in course of time, as the blood is pumped into the lung as before, the pressure must rise, and either an œdematous fluid or a croupous exudation will be poured out. In the case of single embola, however, where they are not septic in their nature, no such exudation occurs; it is quite exceptional to find any hemorrhage, and where it does occur it is punctiform in character, and has not the sharp border and regularly wedge shape of the hemorrhagic infarction found in man, as an accompaniment of valvular disease of the heart.

It is therefore perfectly clear that, even from experimental evidence, there can be nothing proved in support of the embolic theory of the hemorrhagic infarction of the human lung. The pulmonary vessels are only to a certain extent terminal, and plugging of a single small branch appears to be accompanied by comparatively little result.

The human hemorrhagic infarction, however, has a wedge shape. So have the infarctions of the spleen and kidney. It has been concluded far too hastily, in my opinion, that because the wedge shape of the infarction in the latter organs is due to the area of distribution of the splenic and renal arteries respectively, that therefore the shape of the hemorrhagic deposit in the lung is due to a like cause—that it corresponds with the cone or wedge-like expansion of a terminal branch of the pulmonary artery. Gerhardt (Volkmann's Sammlung klinischer Vorträge, 1875, Nos. 31 to 61, p. 722), for instance, makes the following statement:—"Most infarctions (of the lung) result from embolic closure of the artery leading to the part. The wedge-shaped portion of tissue supplied by this artery with its base to the pleura becomes the seat of a regurgitant venous hyperæmia, becomes spongy in texture and infiltrated with blood, which coagulates and converts it into a swollen, granular, darkened mass." Let us examine this statement a little more closely. We have seen that undoubtedly the lung infarction is due to an effusion of blood into a group of air-vesicles and terminal bronchus. The blood is poured out into these so as to distend them. When it escapes into the cavities of the air-vesicles how is it possible that the terminal branches of the pulmonary artery and its attached capillaries can have anything to do with guiding the direction which it will follow? We might, with as good show of reason, say that if the water pipes in the walls of a series of intercommunicating apartments were to burst, the water would be guided in its course by the water pipes which run in the walls. This, of course, is utter nonsense, and so, it seems to me, is the statement that the pulmonary artery causes the wedge shape of the blood effused into the air vesicles. The blood will run, when effused, so far as I see, through all the chambers which intercommunicate, and will be moulded by the shape which these possess. It will be guided by the shape of a group of air-vesicles and its attached bronchus.

To prove that this is so, I have been in the habit of showing to my class for several years past that infarctions, in every respect identical with those wedge-shaped hemorrhagic foci in the human lung, can be produced at will in the dead subject. The method of making these artificial infarctions is to insinuate a canula beneath the pleura, and plunge it into some of the superficial air-vesicles. A coloured injection is now gently driven through this, so as to fill the air-sacs into which it has opened. As the injection is being driven in, an isolated piece of lung tissue is seen to become filled, and to rise above the surface of the neighbouring pleura. When this is incised it forms the exact counterpart of a hemorrhagic infarction. There is no diffuse indiscriminate and general injection of the air-vesicles. The injected part is typically wedge-shaped, with a border quite as sharp as any infarction in the human lung. It is raised above the surface, and has a tapering extremity just as one so often sees in the human infarction.

In view of this, it is well to pause before concluding that such infiltrations are embolic in the human lung. To me it seems that a much more feasible explanation is to be found in the fact of these being simply hemorrhages moulded into a wedge shape by the limits of a bronchus and its attached air-vesicles at the periphery of the lung. One group of air-vesicles is perfectly disconnected with those around it, and the shape of a lobule when seen on section is that of a wedge. The interlobular septa form a complete wall of separation between individual lobules; and when any fluid, blood, or coloured injection is driven into a group of air-vesicles at the periphery of the lung, a lobule, or group of lobules, having a typical wedge-shape, limits the area of its distribution, and prevents it becoming diffusely poured into the lung parenchyma. Hence, although these wedge-shaped hemorrhages are associated with similarly wedge-shaped embolic necroses in the spleen and kidney, the cause of the wedge shape in the one case is the bronchus and its attached air-vesicles, in the other the distribution of the splenic and renal arteries. It is the fact of the two occurring in the same subject that apparently has led to the supposition that they are due to a common cause—namely, embolism. I am firmly convinced that the wedge-shaped hemorrhages, known as hemorrhagic infarctions of the lung, and occurring in valvular disease of the heart, have, as a rule, nothing to do with embolism of the pulmonary artery. They are simply pulmonary apoplexies situated at the periphery of the lung, and moulded into a wedge shape by the shape of the bronchus and air-vesicles into which the effused blood is poured. Of course, if hemorrhage resulted from pulmonary artery embolism, the effused blood might be poured into a peripheral set of air-vesicles and assume the characteristic form; but hemorrhage, when it does occur from embolism of the pulmonary artery, which is a rare occurrence, has more of a punctiform character than the usual hemorrhagic infarction where the air-vesicles are distended with blood. The blood evidently, in the one case, simply oozes or exudes from the capillaries, and becomes entangled here and there in isolated air-vesicles, while in the other it is poured out by a sudden rupture, and injects a lobular mass of lung tissue to its utmost. And when we come to look for the cause of this sudden rupture and effusion of blood, we have only to examine the condition of the capillary vessels on the alveolar walls, in order to see how great the liability to this may be. They are distended into varicose enlargements, are tortuous, and project into the alveolar cavities. What more likely than that these varicose capillary vessels should from time to time give way, and that their contents be poured into the air-sacs on which they ramify. The hæmoptysis of patients suffering from cardiac disease is sufficient proof that they are constantly giving way, and the multiplicity of infarctions seen at a *post-mortem* examination in a single lung shows that it is a widely-spread cause which has originated them.

It is generally supposed that these pulmonary hemorrhages cause a necrosis, as in the embolic infarction of the spleen and kidney, and that the piece of tissue is absorbed, leaving a cicatrix as in these other two organs. This, I believe, is erroneous. Are cicatrices found in such lungs commensurate with the number of hemorrhages that must have occurred during the course of the disease? I have never seen them, and my firm belief is that the blood is absorbed as a croupous effusion is, and that the lung regains its normal vesicular condition. There is no reason why necrosis should follow the effusion of the blood; the artery is not occluded, and, no doubt, sufficient blood circulates within the infarct to maintain its vitality until the effused blood is absorbed or expectorated after disintegrating. Should the effusion be extreme, just as in the case of an unusually dense croupous pneumonia, it might, of course, happen that the part would necrose. This, however, is exceptional. The hemorrhage, I feel persuaded, disappears without giving rise to any appreciable destruction of lung substance.

In formulating the above observations the chief points that I would wish to draw attention to are:—

1. That the infarctions of the spleen and kidney are due to the blood supply being cut off from the part, and the most common source of this is embolic plugging of the respective arteries.

2. They are not usually accompanied by hemorrhage unless in the zone of inflammation which surrounds them, although congestion and punctiform extravasation are possibilities in the early stages.

3. They are veritable necroses, the necrotic changes within them resembling those which follow the total abstraction of the blood supply in other parts of the body.

4. They are in course of time absorbed and the formation of a depressed cicatrix follows.

5. Embolism of the arteries of the brain is accompanied by a similar necrosis, but, as the arteries of the encephalon are

terminal only in certain regions, the necrosis of the part supplied by an occluded artery is never so widespread as in the case of the spleen and kidney. Hemorrhages may occur here owing to the attempt to nourish the part by collateral channels.

6. The hemorrhagic infarction of the lung is simply an apoplexy due to various causes, but by far the most common is rupture of capillary vessels unduly distended by regurgitant pressure from valvular disease of the heart. Its wedge shape is caused by the shape of the bronchus and air-vesicles in which the effused blood is contained, and not by the distribution of a terminal branch of the pulmonary artery. The lesion usually has nothing to do with pulmonary artery embolism, but a hemorrhage from any cause, if situated at the periphery of the lung, will have the usual characters of a hemorrhagic infarction.

7. The blood in these pulmonary infarctions is usually absorbed, and no trace of their former existence remains.—*Liverpool Medico-Chirurgical Journal, July*, 1883, *p*. 161.

66.—ON THE SAFE ADMINISTRATION OF BICHLORIDE OF METHYLENE.

By Wm. Martin Coates, F.R.C.S.Eng., Senior Surgeon to the Salisbury Infirmary.

Some time ago a paper appeared in the Lancet from my pen on the "Safe Administration of Chloroform." (*Retrospect*, vol. 87, p. 412.) From the inquiries I have received about my mode of administration and the inhaler used, from every part of the United Kingdom and distant parts of Europe, I conclude that my contribution has attracted much attention, and I sincerely hope that many lives will be saved by my earnest appeal to the profession to take into serious consideration the necessity for using anæsthetics, as they do other potent agents, in the smallest dose capable of producing the desired result.

In the communication referred to I stated that by putting into Snow's inhaler, modified by Matthews Brothers, first five minims of chloroform, then in twenty seconds ten minims, in forty seconds fifteen minims, and the latter quantity every minute, I produced complete insensibility to pain with a total quantity varying from twenty minims to seventy-five, with, I believed, perfect safety, and with a great diminution of the struggling and subsequent after-nausea and vomiting. I have also found the best means of remedying the struggling or failure of the pulse in the introduction of thirty minims of pure ether by the same inhaler. I promised in the same paper to work out in the same manner the absolute and comparative power of bichloride of methylene. I have since then, both in private and hospital practice, administered the bichloride of methylene with the same apparatus, but without the hot water between the compartment containing the anæsthetic and the outer jacket of the instrument, with the following most satisfactory results. In almost every case the bichloride of methylene was as efficient in the same small doses as an anæsthetic as chloroform. The heart's action in no case failed in the slightest degree, the struggling was less violent, and the after-nausea and vomiting were very much less troublesome. I recollect only two cases where they were present out of a great many administrations. To show that I did not select my cases I will shortly relate two.

Case 1.—A man, aged seventy, but looking much older, had a very suspicious tumour on and extending under the left part of the body of the lower maxillary bone. He had considerable insufficiency of the mitral valve. Mr. Harcourt Coates operated. It was foreseen that a careful dissection would be required, for the tumour dipped into and among important structures under the angle of the jaw. The operation lasted half an hour. I administered methylene. Anæsthesia was obtained by forty-five minims, and kept up by ten minims poured into the inhaler whenever unconscious movements occurred. The quantity used was seventy-five minims in all.

Case 2.—A man, aged forty-nine, with largely consolidated apex of his left lung, with crackling on coughing, under the care of Dr. Coates in a medical ward of the Salisbury Infirmary, suffered from intense pain in defecation. On examining the rectum with Curling's speculum, we saw pus oozing from an opening about an inch and a half from the anus. I decided to make an incision through the abscess, and to divide by the same incision a few fibres of the sphincter ani. This man inhaled 125 minims of bichloride of methylene before he became unconscious, and there was considerable struggling. I performed the operation. He soon recovered his consciousness, and was entirely relieved from pain. Mr. Wilson, our house-surgeon, reported to me that he had suffered no unpleasant after-effects from the anæsthetic. This is the largest quantity required by any patient.

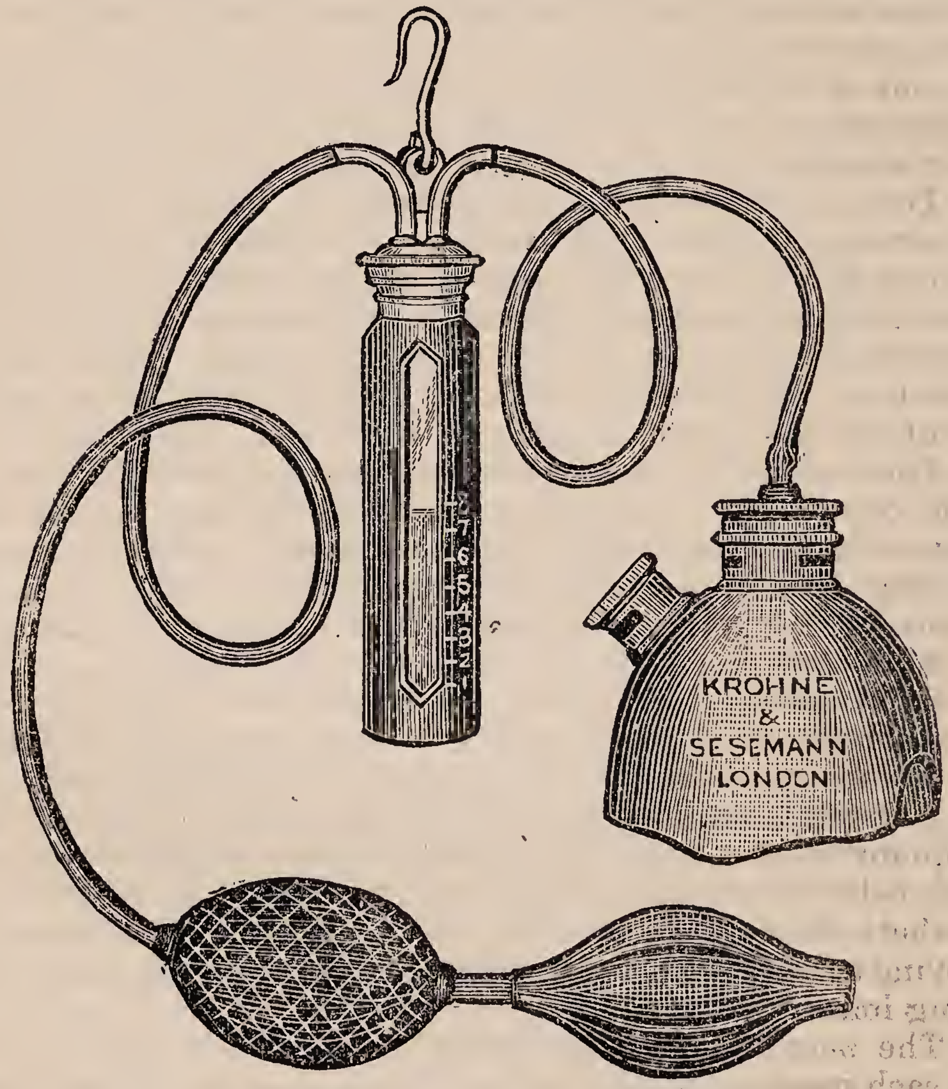
I cannot conceive two more unfavourable cases for anæsthesia, yet no symptom of danger arose. The struggling in both cases ceased on administering through the inhaler thirty minims of ether. The absence of failure of the heart has been mentioned in this mode of giving small but efficient doses of this agent, as also the great comparative absence of nausea and vomiting. I have observed that the patients under bichloride of methylene became much sooner conscious when the inhalation was discontinued than under chloroform. In this lies the comparative safety and weakness of the bichloride of methylene. It does not in some cases abolish so completely the reflex functions as does chloroform, and in two cases of operations on the rectum, where the reflex action is so easily excited, fifteen minims of chloroform were substituted for the methylene, with immediate advantage. For the same reason I can conceive that in delicate operations on the eye or its appendages chloroform would be better than bichloride of methylene. This is a point I shall test with some anxiety, as in some eye operations vomiting is a matter of great importance. I allude of course to extraction of cataract and iridectomy. In the removal of a sightless eyeball from injury I found the bichloride of methylene in an old man quite as effective as chloroform, and, I feel sure, freer from danger. As my plan, no doubt, has been tried by many, and no contradictions have come from any quarter, and as no death has occurred or been reported under this mode of administration of chloroform or bichloride of methylene, and as, moreover, it is in strict accordance with the principle universally acknowledged and adopted with all other potent medical agents—viz., to confine ourselves to the smallest dose capable of producing the result aimed at,—I sincerely trust that in the interest of their patients and of themselves medical practitioners will give this mode a fair trial and record the results. Anyone not doing so and having a fatal case, would be most painfully situated, I should think, at the subsequent coroner's inquest. My conviction is that the danger from chloroform and bichloride of methylene is so minimised by this method, if closely adhered to, that they may be used with the most perfect confidence in persons free from organic disease; and, if I may judge from my own practice, in cases in which we should not have dared to do so—*i.e.*, in cases of advanced organic disease of heart or lungs. The repeated small doses by their insistance on the attention of the administrator might, if necessary, as a gentleman who came from Birmingham to witness this mode said, be advanced as an additional source of safety. I must repeat, in reference to the bichloride of methylene, what I advanced as to chloroform, that as some persons are very easily affected so there are others who require increased doses (twenty minims per minute), though this is very rare.

I may here add that I formerly used Junker's inhaler, but it has not the accuracy of the one I use now; and there is the disadvantage that a quantity of the vapour remains in the atmosphere of the operating room, and so becomes a source of danger. It has been proved on every occasion when looked into that the whole of the fifteen minims of the anæsthetic have been consumed at the end of each minute with the instrument used by me. I trust that my medical brethren will not think that any of my utterances in this paper have been too strong; if so, I hope that in extenuation they will consider my deep conviction that some, perhaps many, lives must be sacrificed if the adoption of small doses be not made general.—*Lancet, July* 28, 1883, *p.* 138.

67.—ON JUNKER'S ANÆSTHETIC APPARATUS.

By Krohne and Sesemann, Duke Street, Manchester Square.

This apparatus consists of three main parts. A bottle holding about 2 oz., closed by an air-tight fitting top, through which two tubes are made to pass, a long one connected with a Richardson's bellows, and a short one, connected by means of Indiarubber tubing to a vulcanite facepiece. The bottle or receiver of the anæsthetic fluid is covered with leather, and the lower half is graduated for 8 drachms. The facepiece, which covers both nose and mouth, is provided with an inspiratory



and expiratory valve. The former can be opened or closed by turning the ferrule of the round top. As a rule it should be kept open.

When using the apparatus, the bottle has put into it from 4 to 6 drachms of chloroform, or methylene, according to the expected duration of the operation; it is then suspended from the button-hole of the coat of the administrator. By pressure of the bellows 4·332 cubic inches of fresh air are forced through the long tube into the fluid and escape impregnated with the vapour in proportion to the contents in the bottle (see table below) through the short tube into the facepiece, from whence the vapour is inhaled. For operations in the mouth or nose, a pliable metal tube is supplied, which is substituted for the facepiece after complete anæsthesia is established, by means of which anæsthesia can be maintained through the mouth or nose, out of the way of the operator.

There are several important points in this method of administering anæsthetics.

1. The patient is not made to breathe again air which has been already expired; fresh air impregnated with fresh narcotic vapour is brought into the facepiece with each pressure of the bellows, which, *when the latter is correctly timed, so as to correspond with each inspiration*, enters the lungs with the inspired air, and each expiration escapes through the valve and at the sides of the facepiece.

2. The patient has not to breathe *through* the apparatus, as is the case with most other inhalers. An air-tight fitting facepiece is therefore not required, and the patient's natural and easy breathing is not interfered with. The required amount of narcotic vapour is brought before his nose and mouth by compressing the bellows at each inspiration and the additional amount of air required to fill the lungs (20 to 30 cubic inches) enters at the inlet valve and more freely at the sides of the facepiece.

3. *The administrator has complete control over the anæsthetic.* The quantity of supply is regulated by the quality of pressure of the bellows and amount of fluid in the bottle. No waste of anæsthetic fluid from external evaporation—a waste often so annoying to the operator and his assistants—can occur, the supply ceasing immediately when the bellows are not compressed.

4. The *maximum* amount of narcotic vapour administered with each inspiration, or the total amount administered to the end of an operation, can be ascertained to be a minim.

5. *Economy of the anæsthetic fluid.* Less than half the quantity of the anæsthetic is used comparatively with this apparatus than with others, and a saving of over 70 per cent. is effected compared with Esmarch's or Skinner's Inhalers, or the folded towel.

6. Nearest approach to safety of administration due to the combined effects of the five points enumerated. By not obstructing the free ingress and egress of air, the second stage, so called struggling stage, is frequently avoided. The patient breathes naturally and goes quietly asleep. By giving the vapour in small known doses with each inspiration, a minimum risk is incurred, and an overdosing is almost impossible. At first, the bellows are compressed with each inspiration, until anæsthesia is complete, after which anæsthesia is maintained by only now and then working the bellows when signs of returning consciousness are noticed.

The following table shows the proportion of anæsthetic fluid evaporated by 100 compressions of the bellows=433,238 cubic inches of air.

Chloroform (*Duncan & Flockhart's*). *Temp. of air*, 65° *Fahr.*

Fluid in bottle.	100 compressions of bellows.	Fluid evaporated.	Dilution from bottle.	Dilution inhaled.
8 drachms	100	120 minims	1 to 1000	1 to 5000
7 ,,	100	120 ,,	1 ,, 1000	1 ,, 5000
6 ,,	100	110 ,,	1 ,, 1090	1 ,, 5450
5 ,,	100	100 ,,	1 ,, 1200	1 ,, 6000
4 ,,	100	90 ,,	1 ,, 1333	1 ,, 6665
3 ,,	100	75 ,,	1 ,, 1600	1 ,, 8000
2 ,,	100	50 ,,	1 ,, 2400	1 ,, 12000
1 ,,	100	25 ,,	1 ,, 4800	1 ,, 24000
	Bichloride of Methylene (*Robbins & Co.*)			
8 drachms	100	120 minims	1 to 1000	1 to 5000
7 ,,	100	100 ,,	1 ,, 1090	1 ,, 5450
6 ,,	100	80 ,,	1 ,, 1500	1 ,, 7500
5 ,,	100	60 ,,	1 ,, 2000	1 ,, 10000
4 ,,	100	50 ,,	1 ,, 2400	1 ,, 12000
3 ,,	100	40 ,,	1 ,, 3000	1 ,, 15000
2 ,,	100	30 ,,	1 ,, 4000	1 ,, 20000
1 ,,	100	20 ,,	1 ,, 6000	1 ,, 30000
	Anhydrous Ether (*Robbins & Co.*)			
6 drachms	100	215 minims	1 to $558\frac{6}{43}$	1 to $2790\frac{30}{43}$
4 ,,	100	180 ,,	1 ,, $666\frac{2}{3}$	1 ,, $3331\frac{1}{3}$
2 ,,	100	95 ,,	1 ,, $1263\frac{3}{19}$	1 ,, $6315\frac{15}{19}$

The evaporation of anhydrous ether is very irregular. At the commencement, when forcing the air through it, a large amount is evaporated, but the scale sinks rapidly with each successive pressure of bellows, or increases if the bottle be warmed by the hand.

It will be noticed, that as the quantity of fluid in the bottle decreases, so does the amount of evaporation, and proportionately increasing dilution of the vapour with air goes on from the first. The maximum of chloroform (for methylene and ether, see table) evaporated by one compression of the bellows, 7 drachms being in the bottle, is $1\frac{1}{5}$ minim, therefore less, but no more than that quantity, 1 in 1000, can be inhaled by the patient with each inspiration. Taking into account that the quantity of air supplied by the bellows at each compression is but from $\frac{1}{5}$th to $\frac{1}{6}$th part of the air required by an adult for natural breathing (20 to 30 cubic inches), the amount of narcotic vapour used in proportion to the quantity of air which enters through the valve and sides of the facepiece is incredibly small (1 to 5 or 6,000). That this small quantity is all sufficient to produce and maintain deep anæsthesia is proved by the fact, that this apparatus has been in use at the Samaritan Hospital since its first introduction, fifteen years ago, when Dr. B. W. Richardson used it for the administration of his then newly discovered bichloride of methylene in a case of ovariotomy under Sir Spencer Wells. The result was so satisfactory that none of the surgeons at the Samaritan Hospital have been using any other apparatus up to the present time.

How small a quantity of methylene is required to complete an operation when given with this apparatus, is stated by Sir Spencer Wells in his work on Diseases of the Ovaries, in which he says, "In some cases less than two drachms was used, and very rarely more than 6 drachms. Dr. Junker's apparatus was generally employed."

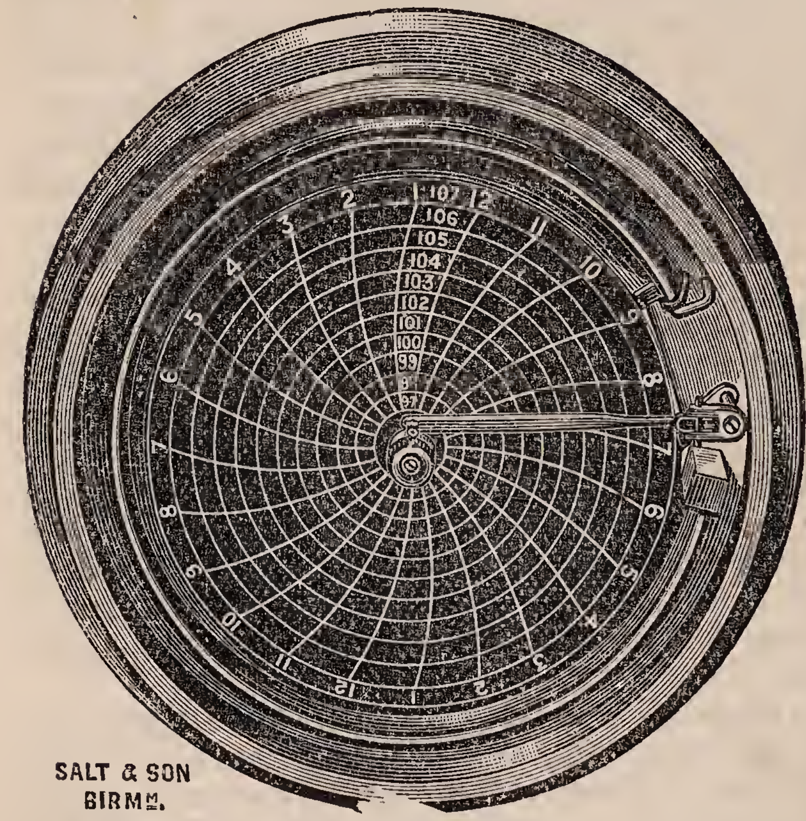
In further proof, showing how little methylene is required to produce sleep, take the following incident: after having reduced by evaporation with the bellows, seven drachms of methylene to one drachm, the writer asked his friend, Mr. Robbins, the well-known chemist and manufacturer of methylene, to experiment upon himself. Mr. Robbins put the one drachm left in the bottle and administered it to himself. He took four deep inspirations, compressing the bellows slowly with each inspiration. This was all he could do, for now he fell fast asleep, and in a few seconds breathed quite stertorously, much to the surprise of everybody. Not more than one minim of methylene was used.

If one minim of methylene taken by four deep inspirations proved sufficient to produce deep sleep, and from two to six drachms only are required for performing Ovariotomies, some of these operations lasting over an hour, it may be accepted, that this method of administering anæsthetics, chloroform or any other, possesses advantages over those methods where the anæsthetic is given in larger doses and less diluted with fresh air.—*Brit. Med. Journal, April* 28, *p.* 21.

68.—BOWKETT'S PATENT CLINICAL THERMOGRAPH.

FOR DETERMINING AND RECORDING ON PERMANENT DIAGRAMS, ALL VARIATIONS OF TEMPERATURE OCCURRING IN A PATIENT DURING TWELVE HOURS.

This instrument, a diagram of which is annexed, was figured in our pages some time ago, but since then, such considerable alterations and improvements have been made in its design and construction as to render it worthy of a further notice, especially when account is taken of the entirely novel departure suggested by its inventor, as regards Medical Thermometry, by the provision of the means of taking *a reliable continuous record of a Patient's Temperature even in the absence of the Physician.* A full description of the instrument, with the methods of applying it, will be found in *Retrospect*, vol. 83, p. 311.



The alterations referred to above consist in the reduction of the weight of the instrument by one half, so that it does not exceed 7 ounces, the size being correspondingly reduced; and in the alteration of the movement, which now revolves once in 12 hours instead of 24 hours, so as to render the dial clearer, and the action more exact. The instrument in its present condition is thoroughly scientific. It is made by Messrs. Salt and Son, of Birmingham, the sole licensees.

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